March, 1953

THE CHEMIST

VOLUME XXX NUMBER 3

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DR. PERCY A. WELLS

Receives Pennsylvania Chapter Award

(See Page 115)

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EDITORIAL

The Mark of a Chemist

By Theodore E. Gilbert, M.A.I.C., Vice President, Bisonite Company, Inc., 128 Lakeview Ave., Buffalo, N. Y.

IN ALL that has been said and written on the "professional status of the chemist", it becomes apparent that the chemist is not really seeking professionalism in the ordinary sense of the word; but rather the things it connotes. He wants the respect of his community through the distinction of his work—distinction for his work as a separate and unique endeavor carrying the dignity and esteem of learning.

Now the point at issue is how to attain this design. No single proposal would be the complete solution; but before the embellishments must come the fundamental.

Anything which is distinct has its identifying feature, and the question can be asked: What is the mark of a chemist? The answer is, there is none. There is no degree in chemistry.

If chemistry is to be regarded as a profession in the same light as medicine or law, a degree in chemistry must first be established. Chemistry within the university must be pursued collectively as the "School of Chemistry," and not as a few subjects incorporated into a "rounded education."

Certainly there is a greater concentration and emphasis on the subject at graduate levels; but even the Ph.D. is merely the product of a department, not identified on the diploma.

There is every reason to believe that the chemical degree would be accepted with high regard at both levels which would initially be necessary. Today, a lawyer graduates with a bachelor's degree while a physician or surgeon as a doctor.

Several foreign universities, in the past, awarded the degree of Doctor of Chemistry and some others Doctor of Organic Chemistry. The prerogative of an individual university to coin a degree led to such a variety that an unwieldy situation resulted. Undoubtedly, even in America, there remains an unsung chemical degree.

And so, it would not do to have an isolated school award a chemical degree. The degree must be established by agreement of the universities and sanctioned by the chemical societies.

The establishment of a school of chemistry as a fixed component of a university would do more to focus the public's eye on chemistry as an entity than any other single event. The degree in chemistry would be the "mark of the chemist" and would be the beginning of the chemist as a figure in his community.

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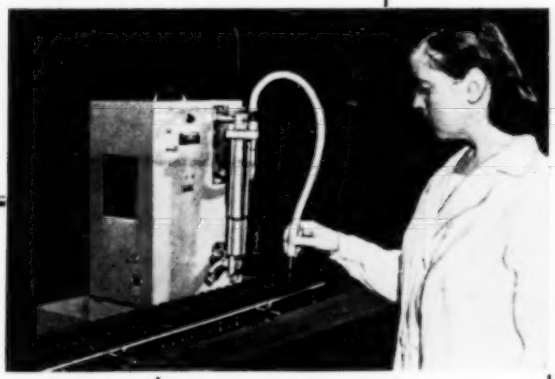

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Some Problems in Research Management

Dr. P. A. Wells

Director, Eastern Regional Laboratory, U. S. Department of Agriculture, Philadelphia 18, Pa.

(Presented when he received the Honor Scroll of the Pennsylvania Chapter, in Philadelphia, December fourth.)

I AM indeed happy to receive your Honor Scroll Award. In accepting the award I share it with all members of the staff of the Eastern Regional Research Laboratory. I have had the great good fortune of being associated with a fine group of people who have made my task an easy one and in every sense they share this honor with me.

For nearly fourteen years I have had the title of Director at our Research establishment in Wyndmoor. Now all of you know that this term "Director of Research" is used to denote the positions of many thousands of scientific administrators. Reference to any directory of research institutions reveals that this term is in very wide use, and many of us so designated have no doubt been pardonably proud of the title. That this title is an astounding contraction of terms, however, will be evident on proper reflection. No one ever *really directs* research *in the normal sense of the word;* it simply can't be done that way. How does it happen, then, that we see all about us a great deal of successful research in all fields of science? I should like to discuss this matter briefly, because it is something that through the years has become an important part of my conviction as to how all of us who have such responsibility must act in managing institutional research.

Most of our scientific research today is conducted in institutions which are organized for the express purpose of carrying out investigations which require organized effort to fulfill their function. The nature of these programs is dictated by the nature of the company business, or what it hopes to make its business. In the case of Government research, the programs are authorized and circumscribed by laws which direct the research into specified fields. In either case we generally are confronted with the same broad boundaries within which we proceed to our ultimate objectives. The most difficult of all problems in managing such research is to reconcile the demands of organized effort with the freedom of the individual to pursue his chosen line of inquiry. Productive research requires a great deal of latitude in the

choice of problem and manner of approach. At the same time the total organized effort demands some restriction of direction in the interest of gaining the specified goals, whether these be established by company boards of directors, by Acts of Congress, or by any determinant group which has the responsibility of footing the bills.

Guideposts for Government Research

My experience has been confined to research in the Department of Agriculture, where many varied types of investigations are conducted. These studies are authorized by the Congress under broad statutes which set forth the objectives. They tell us what the investigations are expected to accomplish and, by so doing, they restrict the field of activity. Various research agencies of the Department find their specific missions stipulated in the different sections of the broad statute authorization. These further restrict the scope of work assigned to the research branches, and hence they narrow the field of the individual investigator. The important point to consider here, however, is that although the Congress specifies in broad terms *what* we should do, it does not tell us *how* we should do it. Within the broad Congressional authorization there is always sufficient latitude for the agency and for the scientist to exercise the degree of freedom necessary for good research. These legal restrictions, then, do not have a stifling effect; they serve as valuable guideposts which steer the investigators on a given course.

The Congress also imposes one other restriction through annual appropriations which establish *how much* can be done. Progress is reviewed each year in connection with these appropriations. Just as company boards of directors expect prudent management, wide-awake diligence, initiative and reasonable progress, so do our Congressional committees on appropriations. But here again decisions as to how the program goals are to be reached are properly left to the judgment of scientific administrators. One often hears the complaint among Government research administrators — and I suspect this would also be true in many areas of industrial research — that it is impossible to get support for fundamental research even though such work is specifically included in our broad research authorizations. The answer to that apparent dilemma is, I think, a very simple one. If fundamental work is required to provide the background of information necessary to reach the goals established for us, it is up to us as administrators to assemble scientific personnel capable of doing that kind of work and proceed with our task. Since the Congress does not specify how, it is our clear responsibility to

make this determination. The goals themselves provide the justification; it is not necessary to justify the method of approach.

The Conditions Which Bring Success

Now what does all this mean to the research administrator in managing his program? It is apparent that within the framework of broadly stated goals or objectives it is his problem to establish the conditions which will lead to success. I am certain that no one person has all the answers for this kind of situation, but let us consider some of the things that may play a decisive role in the success or failure of his efforts.

The old adage — "A man may well bring a horse to the water, but he cannot make him drinke without he will" — is never more forcefully demonstrated than in this field of human endeavor. *You can lead in research, but you cannot direct it.* This concept stems directly and simply from the very nature of research itself. It is a thing of the mind and of the spirit. It can be nurtured, but not forced. It is a quest for new knowledge, no matter what the motive. It is creative. It must be done in a proper atmosphere — an atmosphere of freedom.

I suppose there are many ways that research can be managed to achieve success. Certainly all of the successful research is not being supervised or carried out in the same fashion. The personal qualities, backgrounds and inclinations of our research leaders are of the most varied sort. Yet somewhere there must be certain essential qualities that are common to all who find success in this field.

First of all, I think, is the recognition that research is done by persons who as individuals have the same aims, ambitions and hopes of all people. It is therefore imperative that research managers understand people, and this is in no sense a peculiar requirement; it is a common quality needed for leadership in any field. But a primary requirement, and one not too well understood or appreciated, is that *to understand people you have to like people.* A study of the principles of psychology is undoubtedly an enormous aid in understanding human reactions, but even a lifetime of such study would be inadequate to overcome the handicap of simply not liking people. It is obvious that such a person would fail, not only in research leadership, but in any other similar capacity in any field.

Granted that one does like and does understand people, and has adequate competency in his science and specialized field. What else? Given a competent staff and well understood objectives, what can he do to insure success? In this situation a lazy administrator would probably do quite well. Since I am saying this in all

seriousness, this statement requires some explanation. The lazy person would tend not to bother the man in the laboratory, but leave him to his own devices. Disregarding the reason for so doing, most of you will recognize that this would, in general, be a desirable course of action. Now, I do not advocate this do-nothing business, but it is no worse than to over-supervise or over-administer the research. Over-administration, I may say, represents a needless waste of energy since it is bound to fail. More serious, however, are the mental barriers which it may establish and the stifling effect it can have on individual initiative. Research administrators must recognize and keep in mind that progress in research is determined to a large extent by the man in the laboratory and by his mental capacity and attitude. If we impair or hinder individual initiative through over-supervision we will eventually drive our ship on to a barren shore.

Freedom in research is of the utmost importance and perhaps is the most difficult of all to achieve. It is also the least understood, particularly by the individual scientist. Graduation at any level from the best of our accredited educational institutions affords no guarantee that the individual will be capable of independent study. Only after he has had an opportunity to participate in an actual research project can his ability be determined. His situation is somewhat analogous to the trained but untried soldier. Only actual combat can establish his capacity to participate in battle. Similarly, the research man must demonstrate his mettle before he can be turned loose to work on his own initiative. To do so before an adequate trial period might well be disastrous for the individual, since, if he fails, it may take years to re-establish his lost confidence. Research independence is thus obviously not a right, but something to be earned. If this principle were better understood it would save the research supervisor a great many headaches.

The major problem, then, of any research supervisor is to avoid a system of arbitrary direction. He must establish instead not only the kind of conditions which are conducive to good research, but also to bring about in his associates an ever increasing ability to work independently and to exercise the freedom of mind so essential to creative work.

We speak of desirability of fostering and developing the proper atmosphere for research — a creative atmosphere, if you will. Just what is this elusive quality that should characterize every good research group, and how do you go about achieving it? It is a thing unreal, and yet at once apparent when there. It defies definition in any formal sense, yet in its presence the meaning becomes crystal clear. Optimism and hope in the face of repeated failure; faith

that ignorance must always yield to truth; confidence in the power of objective reason. These are a few of the symbols. Like research itself they are things of the mind and of the spirit, and they can only be cultivated with kindred tools. We research administrators and supervisors can do most by expecting the best — a proper professional attitude, unselfishness, objectiveness, determination, diligence, and an uncompromising zeal for the truth. We can also do some other things; we must see that the right person is on the right job; we must see that achievement is recognized, we must encourage and suggest, we must provide a proper degree of freedom, and last, but not the least, we must have a patient faith that the efforts of our colleagues will succeed.

P. A. Wells—Director and Manager of Research

Dr. J. J. Willaman

Eastern Regional Laboratory, U. S. Department of Agriculture, Philadelphia 18, *Pa.*

(Presented when Dr. Wells received the Honor Scroll of the AIC Pennsylvania Chapter.)

THE complimentary things I will say about P. A. Wells are said every day by someone around the Eastern Lab. I have often wanted a chance to say publicly what I and the rest of our staff think about our director. He is a friend of everybody. He is sincerely respected and admired and liked. We take to him our troubles and our triumphs. We make requests. He loves to say yes to them, but if it has to be no, he will patiently explain why, and the requester goes away satisfied. Often he has to make requests of us — sometimes irksome and bothersome things, as in any one's day's work. He does so almost apologetically. He is really loath to bother us. He likes to leave us alone. It is inconceivable that he would call in Jim Smith and say, "Dr. Smith, Washington wants so and so prepared by a week from now. Let me have it by tomorrow afternoon. And they want it complete and they want it better prepared than the last time. Drop everything and do it". No, Wells doesn't direct us that way. He would say, "Jim, remember that so and so report we prepared last year? Well, Washington wants it again and they want it a week from today. Do you suppose you can sandwich it in and get it ready in four or five days? Might make it a little longer than last year's. You have it all at your fingertips anyway." That's the way he directs and manages.

Dr. Wells was born on October 3, 1906, at Spooner, Wisconsin. That was still rugged country — heavy forests near by, fishing streams everywhere, Indian reservation not far away. He grew up as part of it. He can't remember when he couldn't swim, fish, and skate. One day, when he was about twelve, he caught a 12-pound great northern pike, and carried it fifteen miles to his home.

Also at twelve he worked in the yards of the Omaha Railroad at Superior, Wisconsin. That is where he was at 11:00 A.M., November 11, 1918. An extracurricular activity was to go to the yards after school, sweep grain out of the emptied cars and sell it for chicken feed — and I mean that both ways. One night his gang got into a watermelon car, by mistake, but their efforts went fruitless when trainmen arrived on the scene.

He went through high school at Monmouth, Illinois, and attended Monmouth College one year. But in that year he came under the spell of Professor W. S. Haldeman, and from then on it was chemistry for Perce Wells. Haldeman was recently honored by the St. Louis Section of the A. C. S. for his lifetime work in thus influencing students.

Then the family moved to Minneapolis and Perce finished his undergraduate course at the university in 1928. He went right into the Bureau of Chemistry and Soils and has been in it or its successors ever since. His first professional job was determining arsenic on apples in a windowless lab in the post office in Wenatchee, Washington. His next job was again in a lab without windows, because it was the great outdoors around the smelter at Trail, B. C. He was part of a crew that lugged apparatus around the area to determine the incidence of sulfur dioxide at varying distances and directions from the smelter. Sometimes this lugging was for sixty miles.

In 1929 he went to Washington, D. C. He got into a laboratory with windows, but he was still analyzing for SO_2. In 1930 he got his real start in biochemistry by working with the well-known team of H. T. Herrick and O. E. May. For the next eight years he was delving into the mysteries of mold fermentations and coaxing more and more efficiency out of them in the production of gluconic, citric, kojic, and ketogluconic acids. Many times during this period the clock and the calendar meant little, since there was no instrumentation beyond an indicating pressure gauge and the fermenters had to be watched constantly and sampled frequently. Then they got to teaching *Acetobacter suboxydans* how to make sorbose from sorbitol, and this was even trickier. Wells says of this period, "I was too poor to continue graduate work at night school, so I just worked." When the Regional Laboratories

came into being later, he had the satisfaction of seeing this fermentation laboratory evolve into the fermentation division at the Northern Lab in Peoria and go on to fame by its part in the development of penicillin.

In 1936 the group was sent to Ames, Iowa, to the Bureau's by-products lab to set up a pilot plant size rotary fermenter for the submerged culture of molds under oxygen pressure for the production of gluconic acid. It seems that at this lab the motto was "Each chemist his own pipe fitter and carpenter." Wells says, "This was a waste of professional salaries, and I vowed I'd have it different if I ever got the chance. I have had that chance at the regional lab and I have done it. But at the current rates for chemists and plumbers perhaps we don't save so much after all." At Arlington Farm in Virginia, Mr. Herrick had had a gallon of corn steep liquor in a corner for several years. He didn't know how he got it or why. Funds for media were running low. Then one of the boys said, "Let's put some of Horace's corn liquor in this one". Improvement in the fermentation was immediate and amazing. A few years later corn steep liquor really came into its own in penicillin production.

In 1937 Wells was back in Washington. And in 1939 he completed his work for the doctorate at Georgetown under Dr. M. X. Sullivan, his thesis being in the fermentation field.

About 1937 Senator Bilbo's constituency had persuaded him that the federal government should set up a research lab in the south to develop more uses for cotton, badly distressed at the time. As he discussed the idea around Congress, others caught on quickly. "We should have one for milk". "We need one for corn". Thus the idea of the four regional labs took shape and they were established in 1938. By means of chemistry and chemical engineering, they were to conduct research on the utilization of farm crops, especially industrial utilization, since "Although the human stomach is easily filled, the industrial stomach never is". There were to be four laboratories, in the north, south, east, and west.

This was the groundwork. But in the office of the Bureau of Agricultural Chemistry and Engineering many questions immediately began to pop up. What commodities? What crop for each region? Just the wastes, or the main crops? Just industrial use, or food also? What really were the possibilities? What did industry think? Did the universities and state experiment stations have any ideas?

Obviously, these hosts of questions had to be answered before a firm plan of organization and of research could be established. They organized a survey team under H. T. Herrick, and D. F. J. Lynch covered the South, T. L. Swenson the West, O. E. May

the North, and P. A. Wells the East. They asked hundreds of questions at hundreds of interviews with industry, institutions, universities, and experiment stations. Then they boiled it all down and published the findings in *Senate Document* 65. This document became the basis for the projects in the four labs. Even now, after twelve years, the facts, ideas and relative importance of problems considered there are still valid. The four men who headed the survey became the directors of the labs in their repective regions, with Wells at the Eastern.

On the occasion of the laying of the cornerstone of the new lab, Wells was there, in the mud, expediting everything, guiding the V.I.P.'s to dry spots, generally looking after things, but really remaining inconspicuous. My wife remarked, "What a young looking fellow to head this lab". He looked young because he was young.

And he still looks that way. But he has had the enthusiasm, the technical knowledge, the human understanding, that has enabled him to guide this lab in what I think has been a successful career. There has been a notable stream of publications, of both basic and applied nature. There have been new products and they have been developed commercially. There have been patents, a normal proportion of which have been used by industry. The program of research has shifted with the demands of changing times, but never just for the sake of change, and never because of some whim of the director.

His task has not been light, of course, but you would never know it to be with him at off hours. He gardens furiously; he cans the stuff assiduously. He plays bridge intently. He talks football like Walter Camp. He pitches a mean game of horseshoes. He ardently goes deer hunting each year, still looking for his first one. He brags about his two daughters to the degree that any proper father should.

He has always insisted that, whereas a man may direct the research of a few others, when the number gets up to one-hundred or more he can at best be only a guide and manager — sifting project ideas that are brought to him, helping to get them crystallized, seeing that the staff gets what it needs in the way of space and equipment and what it deserves in the way of salary; keeping the research in line with the budget and objectives prescribed by the ultimate boss, in his case Congress. At any rate, title him what you wish, he is doing a splendid job at it. And, like the big league ball player, makes the job look easy. All of his present and former colleagues will be gratified at the honor and recognition that are being given him.

Presentation of the Honor Scroll to Dr. P. A. Wells

DR. PERCY A. WELLS, director of the Eastern Regional Research Laboratory of the U. S. Bureau of Agricultural and Industrial Chemistry, Philadelphia, Pa., received the 1952 Honor Scroll of the Pennsylvania AIC Chapter at ceremonies held in Philadelphia at the Penn-Sheraton Hotel, December fourth.

Dr. Arthur Osol, F.A.I.C., professor of chemistry and director of the chemistry department at Philadelphia College of Pharmacy and Science, acted as toastmaster. Adalbert Farkas, chairman of the Chapter, presided. Dr. J. J. Willaman of the staff of the Eastern Regional Research Laboratory spoke on "P. A. Wells — Director and Manager of Research." AIC President Lincoln T. Work then presented the Honor Scroll to Dr. Wells, who responded with "Some Problems in Research." (These papers appear in this issue of THE CHEMIST).

Dr. Wells, who has been head of the Eastern Laboratory since it was established by Congress in 1938, has been preeminent in research on the utilization of farm products. Under his guidance, laboratory scientists developed the drug, rutin, used in treating certain blood vessel disorders, from buckwheat plants. Laboratory scientists also perfected methods for recovering the volatile flavors from fruit juices. The flavors are used to restore the full fruit flavor to jams, jellies, beverages and fruit juice concentrates.

Other Laboratory accomplishments include the production of valuable industrial oils from waste animal fats, a superior varnish from potatoes, bristles from skim milk, and chemicals and animal feeds from waste leafy vegetables.

The most recent Laboratory development is a superconcentrated grape juice which makes 75 per cent more full-strength juice than is obtained from the same volume of frozen concentrates now on the market.

Dr. Wells is an alumnus of the University of Minnesota and received the Ph.D. degree from Georgetown University. He is a career Federal employee, having entered the civil service as chemist in 1928. He was appointed head of the Eastern Laboratory when only thirty-two, charged with the responsibility for research aimed at finding new uses and expanding markets for various research farm products of sixteen northeastern states.

The Honor Scroll, given in recognition of technical proficiency and service to the profession of chemistry,

—U.S.D.A. Photo by Audsley

AIC President Work, Dr. P. A. Wells; Dr. J. J. Willaman, Dr. Arthur Osol; Pennsylvania Chapter Chairman A. Farkas, and Vice Chairman Dr. Walter W. Thomas.

is the second made by the Pennsylvania AIC Chapter. The first award was presented last year to Dr. Emil Ott, research director of Hercules Powder Company.

The citation to Dr. Wells reads:

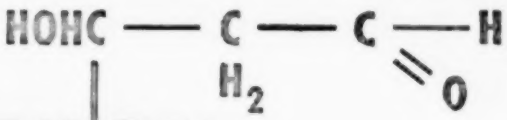
For his inspiring and capable leadership of chemists in research and his untiring efforts in behalf of the profession of chemistry.

Formed: A fire protection and safety research group by Armour Research Foundation of Illinois Institute of Technology, Chicago 16, Ill. The head of the group is John J. Ahern, director of the Institute's department of fire protection and safety engineering.

Appointed: By Brown Chemicals, 15 Moore St., New York 4, N. Y., manufacturers and distributors of vegetable oils, Dan D. Downes as sales manager.

Increased: The number of chemical companies with securities listed on the New York Stock Exchange, the Manufacturing Chemists' Association announced recently. During the past quarter-century, this increase has been seventy per cent, "reflecting the dynamic competition existing in the industry . . . The growth in chemicals assumes even more significance when it is realized that the total number of all companies listed on the New York Stock Exchange actually declined from 1419 to 1288 in the 1929 to 1953 period."

Plans: Announced for a new plant to be built by Mathieson Chemical Corp., at Morgantown, West Va., to produce caprolactam. The plant will provide a source of raw material for American Enka Corp., in the manufacture of nylon. American Enka is building a new nylon fiber plant adjacent to its rayon yarn factory at Enka, North Carolina.



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The Technical Editor's Approach to an Expanding Literature

D. O. Myatt

Managing Editor, Industrial & Engineering Chemistry

(Presented at the AIC Annual Meeting, May 7, 1952, as part of Concurrent Session C, "The Situation in Chemical Literature.")

ONE of the most dramatic phenomena of the age in which we live is the explosive expansion of science and its application to human affairs. This fact is so obvious that it hardly needs to be pointed out. However, it might be interesting to take a look at some quantitative measures of the rate at which these increases have been occurring in the periodical literature within the very short span of the past five years.

The articles in the field of chemistry that have been abstracted by *Chemical Abstracts* have been increasing at an average rate of nearly 15 per cent a year. In the nine-year period from 1942 through 1951 the American chemical literature, as indicated by the "primary" publication in American Chemical Society journals (except C.A.) has more than doubled. It is reasonable to interpret this as a measure of the increase in chemical progress. Another criterion is the volume of new information multiplied by the number of people who are utilizing such information. The combined effect of these two elements, represented by the total page impressions of all ACS publications, has increased nearly four-fold in the same nine-year period.

These figures are impressive, but they are not an end in themselves. What is their significance — what have been the factors that are behind these increased activities? I believe a great and relatively new force is responsible. It has arisen because science is being utilized in our industries in a volume and to an extent quite beyond anything our civilization has ever seen before.

Many of our most recent and fastest growing industries are literally based upon science. The electronics industry, the atomic energy industry, the chemical industry, the aeronautical industry — each of them can trace most of its origin to scientific knowledge. Moreover, the continued existence of an individual company in these industries requires a continuing plowing of the field of science, upon which its competitive standing depends.

This ever-increasing investment of our industries in science — and there is not one industry that has been entirely untouched — may bring about some fundamental changes that may

be of historical significance in the recording and communication of knowledge. The interests of industry are utilitarian and they will draw upon knowledge from any field or established discipline where the answers will aid in achievement of the desired result. And the stakes are big. A company about to make a commitment that may involve millions of dollars cannot afford to overlook useful answers from any source. Our science-based industries undertake creative research to keep up with a research-minded competition. In some instances, they will do background research so that they can more effectively exploit existing knowledge as it appears in the literature.

In this process industrial research adds to knowledge as well as drawing on it. In its main line interests it must start substantial studies from which it derives much of its competitive strength but which also gives it an opportunity to return to the great stockpile of technical knowledge, new data and new physical facts. As it works to master new techniques, correlary to its basic objectives but necessary to their achievement, it will investigate many specialized areas that superficially appear to be far removed from its field of practical interest.

As industries have developed an organized exploitation of scientific knowledge, so have emerged also new kinds of technical people to operate the characteristic team approach in technical development. The pure scientist no longer stays in his solitary laboratory; rather, he is sought out as a consultant to contribute his specialized background when practical problems arise to demand his skills. As an individual, he thus is finding it necessary to interpret his specialty's implications for a specific practical objective.

The applied scientist has come into his day. He is the spearhead of the team, who exhaustively examines the known fundamentals that bear on a definite project. Technologists must use more scientific principles as knowledge expands. Experience and know-how are valuable qualities, and the need for them may never entirely disappear. However, they can be disastrously expensive and inefficient unless they are supplemented with a keen utilization of available scientific knowledge. The field of chemical engineering offers a dramatic illustration of the progress that has been made in the sciences underlying one field of technology.

Technical economics is a second field that is still very much composed of empirical elements, but which promises to be based on a more rational scientific foundation before many more years have passed.

Finally, in the direction of these great industrial efforts we find a new type of scientist appearing, one who might be termed a scientific executive.

He is a person who must base his budget and program decisions on a sound perception of the most rewarding expenditures in various technical areas. He must be a person who understands the value of research but who can, furthermore, evalute it quantitatively and know how much research effort is worthwhile for the particular problems investigated. The scientific executive must have sharp judgment to balance the timing of a development. He must know enough science and contemporary physical knowledge to decide when a process must be frozen; to freeze it early enough to capitalize in a competitive situation, but not before his team has succeeded in weeding out the elements that are technically obsolescent.

Two new and extremely significant elements have thus entered into the domain of science. The first is industrial interest, with its readiness to draw from any area of science that might aid in solving a practical problem. The second is new types of scientists and technologists, who in their group activity follow across and between the traditional fields of scientific knowledge to gather the pertinent facts for solving their practical aims. Together they constitute a powerful force, I believe a nearly irresistible force. History may ultimately credit it with the great achievement of reweaving of the scattered strands of individual scientific disciplines into a single fabric. It dazzles the imagination to visualize a future in which we have reestablished the panoramic perspective of a da Vinci, while commanding the factual knowledge of the 20th Century.

We may not live to see the ultimate consequences of this rapidly accelerating industrial utilization of science. However, even today a great many people and a great many dollars are being employed in an effort to cope with some of the specific problems that arise from this new interest. Principles and techniques of communication, previously studied largely through intellectual curiosity, are now tagged with a large dollar sign.

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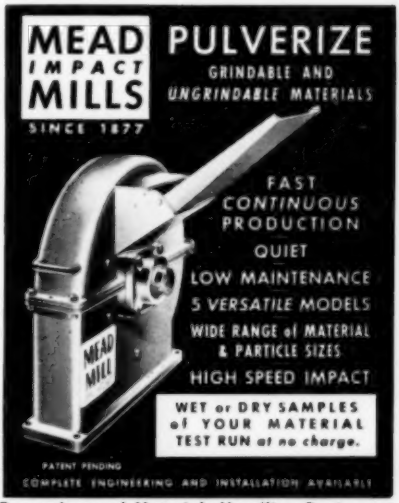

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The people who are working on communication problems have no small task. As industry integrates the sciences, communication needs grow more complex. The volume increases of our recorded knowledge alone aggrevate the mechanics of indexing and searching. Superimposed on this larger total volume of material that has to be kept in some suitable reference form we also need more communication across the disciplines. The consequence — ever larger demands on the technical journals. We can turn again to *Chemical Abstracts* for a measure of this trend. The subject index entries per abstract nearly doubled between the period 1927-36 and 1947-51. Currently, CA prints 700 index words for every 1000 abstract words. In 1912, CA was abstracting from 588 journals. Today, the total exceeds 5,600.

As the subject area being searched enlarges the need for more efficient searching methods becomes tremendous. But this is not the whole story. We utilize our literature not only as a means of recording information in a manner that will allow us to find something that happens to be recorded there. We use it also as a means of communicating new ideas, for helping the reader of an original article to learn of developments that he can combine with his own knowledge and interests to create something entirely new. This creative function is not served too effectively by the preparation of an index, even CA's comprehensive treatment, which is primarily designed to provide the answers to definitely crystallized questions. There was a time not too long ago when the original journals themselves were not too large to allow a technical man to "read his journals" to learn of new advances that suggested new ideas to him. With the continuing outpouring of research results at the volume it has now achieved, plus the tremendous accumulation that is now in the literature, we must recognize that this method of learning and assimilation is beginning to break down. At two minutes per abstract, we can easily calculate that the reading of *Chemical Abstracts* alone would now be a full-time job. If we are to preserve that vitally important creative element as a characteristic of our literature we will need to evolve new methods so that this type of information can be communicated more effectively. I believe that we will eventually develop radical new methods in the communication of original technical information if we are to succeed in retaining this function.

Editors of technical journals are reasonably responsive to the known needs of their readers and we can see today in our technical magazines some changed techniques that begin to answer some of these requirements. They have had sufficient success that journal readers are, I believe, reasonably satisfied that the editors are striv-

ing to answer these new needs; however, it would be an overstatement to claim that many of these recent innovations have been of any revolutionary nature. Perhaps the closest thing to a new pattern of communication has resulted from the steady increase in the use of punch cards, but even this as a basic technique is far from new. A woven portrait in silk of Jacquard, the inventor of the Jacquard loom, was woven on a Jacquard loom in the early 1800's. The weaving of this portrait was accomplished with no less than 20,000 punch cards, which controlled the loom to make the portrait.

While the golden era of scientific literature may still be considerably ahead of us, it is interesting to examine a specific technical journal to see how a considerable number of its editorial features have introduced new elements intended to improve the transmission of knowledge. I have chosen *Industrial and Engineering Chemistry* for my case history, partly because it is a fairly well-known journal. This particular journal also allows me the liberty of interpreting it a little more analytically than I would dare to presume with some other publication.

The editors conceive *Industrial and Engineering Chemistry* as a multifunctional journal. It is a vehicle for recording the results of applied research in the chemical field in sufficient detail that it can serve as a substantial working reference for people attempting to solve technical problems. We conceive this to be its primary function. A common denominator for virtually all of its editorial content, therefore, is the inclusion of the actual working data that will be useful for that purpose. The contributed articles are consequently very detailed and often quite lengthy. While we go to considerable pains in the editing of the manuscripts, the final articles reveal our willingness to make a conscious sacrifice of easy and quick reading so that all the pertinent technical information will be included that might be needed by a reader who is going to apply the information. The second major function of I&EC is to serve as a vehicle for the transmission

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of new ideas, to present the record of new findings given at a technically informative plane. The original information that appears on our page has a new value in its own right for people interested in the scientific aspects, for the technologists, and for those who must concern themselves with the economic implications of new technical information on existing processes, products and markets. We believe that telling this news to our readers is another function that is of primary importance. This consideration is thus a second major factor in our editorial treatment.

Since I&EC is a publication of the American Chemical Society it is appropriate to consider how that fact influences our editorial approach. Many Society publications are essentially "transactions" organs for recording papers presented at meetings and publishing information of interest because of its organizational nature. I&EC is not edited in that fashion. Our customer is the technical reader. A keystone of our editorial philosophy is the publication only of that material that will best serve the interests of our readers. We are essentially a scientific and technical publication and not a Society organ. At the same time we naturally exploit to the hilt the advantages that we have because of the relationship with the Society. For example, we have first choice of a tremendous wealth of strong technical papers in the field of applied chemistry as a result of the Society's meetings program, and these papers constitute approximately half of the editorial matter in the journal. The other half comes to us as articles originally submitted to the publication or through material promoted by the editorial staff through direct correspondence. Our status as a Society publication also gives us the services of many extremely skilled persons who are willing to review without pay and in minute detail the papers we are considering for publication. The uncounted manhours of effort put in by reviewers and authors alike to make each issue of I&EC an authoritative and reliable record of chemical knowledge is a heart-warming proof of the willingness of today's chemists and chemical engineers to contribute very substantially to the advancement of their profession. This resource is the principal reason for the high prestige enjoyed by I&EC as a technical publication.

To sum up, I&EC's editorial approach avoids the pitfalls of its Society affiliations while exploiting the benefits it can obtain from it. If there is any pitfall it lies in the obligation we recognize to publish all papers submitted that constitute a significant addition to the literature. At present the ratio of editorial to advertising pages in I&EC is approximately 75 per cent and 25 per cent respectively. In private publications usually that

ratio is nearly reversed. A private publication that is essentially a business venture would find such a philosophy an expensive policy indeed. For an ACS publication it is the only right one so long as we have the financial resources to follow it. This is no academic problem. Taking 1946 as an index of 100, unit costs of composition, presswork, and engraving, which account for about 75 per cent of our publication expense, are now at a level of about 225. Superimposed on that increase in unit costs is the larger size of the publication. Total pages in 1946 were 3104. In 1951 we printed 4736 pages, an increase of 52 per cent.

In the past ten years many of the features in I&EC have been modified and many new features have appeared. Most have had the objective of giving the reader an opportunity to gain a broader understanding of the field of applied chemistry. Many contain interpretive elements that make the subject matter more intelligible for a reader who is in a distinctly different field of interest. In our I&EC Reports, for example, we attempt to retain a scientifically informative content, but we also include interpretive comment and write the item in a way, that should be understandable to any technically trained person. We have gone to considerable lengths to write I&EC Reports in an interesting editorial style, so that the reader would be encouraged to read the whole five pages of this feature that appear each month. Our monthly reader survey shows that Reports are one of the most widely read special features of the journal. We hope that the readers of I&EC Reports will thus obtain a broader understanding across all the fields of chemical science than they would be able to get with the equivalent time spent in reading original articles.

Our annual reviews are essentially selective literature surveys organized so that the reader can bring himself up to date, once a year, on all of the outstanding new contributions to the literature in a field that spreads across all of the industrial areas where chemical engineering is employed. A comprehensive bibliography is provided with each of these sections, so that the reader can go back to the source material wherever the comments in the Review suggest some immediate application in his own field of interest. We publish reviews appearing annually on chemical engineering unit operations, materials of construction, and unit processes. On a

biennial basis we present a Facts and Figures feature summarizing statistics of chemical production, markets, and sales that are of major interest. This particular review also contains a major feature treatment of some specialized topic each time it appears. The Materials of Construction Review carries an extensive tabular section.

Another special editorial feature that gives a fairly broad treatment of major fields, of interest across the board in our science, is the monthly column. The columns are written by men who have been recognized as authorities in their field and constitute a commentary on recent developments that seem to be of noteworthy significance. A list of the topics so treated is given below:

Equipment and Design—C. O. Brown, Consultant, New York
Instrumentation—Ralph H. Munch, Monsanto Chemical Co.
Corrosion—M. G. Fontana, Head, Dept. of Metallurgy, Ohio State University
Plant Management—W. von Pechmann, Consultant, North Hollywood
Materials Handling——T. W. Rodes, Carbide & Carbon Chemicals Co.
Industrial Wastes, H. R. Murdock, Consultant, Atlanta
Atmospheric Pollution—L. C. McCabe, Chief, Fuels & Explosives Div., U. S. Bureau of Mines
Safety—V. R. Croswell, Manager of Safety, Hercules Powder Co., Inc.
Industrial Hygiene—H. H. Schrenk, Research Director, Ind. Hyg. Foundation, Mellon Institute

Here again we are presenting a broad treatment of topics that are specialties in their own right. However, they are also subjects that should be followed by virtually every professional man to keep conversant with the major advances in techniques that influence the over-all aspects of his work.

About four years ago we inaugurated an editorial feature that has represented a major investment of editorial staff effort. This is our Staff-Industry Collaborative Report series, or our Plant Process series. These articles begin with a broad historical review of the development of a particular industry or product and follow this introductory history with a detailed description of a full-scale manufacturing installation in that industry. By using our own staff in the preparation of these articles we are able to maintain a consistency of editorial treatment that is difficult to accomplish when we are depending solely on an outside contributor. These articles are a 10- to 15-page review of a major subject area that will serve the function of bringing the general reader up to date on the progress in an important industrial chemical area. As such they also are serving this increasingly recognized need for communication across the established disciplines and industrial fields of chemical production. A second and equally important objective of this series is the publication of production technology at a high level of technical informativeness. Here we are frankly trying to dramatize the need for an

enlarged concept of the literature that will benefit the industrial chemist and chemical engineer. We strive to obtain in these articles a treatment detailed enough that it will constitute a good published reference source for the production technologist. If we are ever to expect a science of production we must develop an adequate literature necessarily empirical at first, that records contemporary practice. At some later date, if we begin now to accumulate a factual record, we might eventually develop a science underlying the best techniques of industrial practice and production. This aspect of our Plant Process Articles is obviously aside from my principal topic, but it is another very important objective that we see behind this particular feature. Parenthetically, I can add that our Pilot Plant feature is being presented with the similar hope. Through it, we are trying to strengthen the literature that is appropriate to the needs of the process development engineer when he scales up the research laboratory results toward the ultimate objective of full-scale plant design and operation.

I&EC Briefs is another feature element of the magazine that was introduced starting last January. Essentially, Briefs is a six to ten page summarization of the entire content of the technical section of the issue. Its principal purpose is to serve this same basic need for conveying a large volume of information in the shortest possible time and in the most interpretive fashion. There are a number of I&EC's readers whose work does not permit them to afford the time to read the entire content of the magazine. Briefs was created essentially from the abstracts we have long carried at the beginning of the individual contributed articles. However, we have broadened the content of our abstracts to make them a more useful, yet still concise summary record. We started about a year and a half ago to urge the authors of the individual articles to keep their abstracts technically informative, but also to add a statement that would quickly present the reason why the work was undertaken and then to present a final statement which would summarize the practical significance of the results reported. We have made good progress in obtaining this information from the authors. It has been gratifying to learn that our readers have been favorably impressed by this new section, that is also being recognized as a practical means of enabling the person pressed for time to follow the record of serious technical publication

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more effectively than our previous editorial treatment permitted.

Finally, we have undertaken a number of activities aimed at making the so-called commercial literature more accessible in an orderly fashion. For several years we have carried the "Industrial Data" feature, which recorded the new announcements of products and new technical bulletins that were made available by manufacturers. Just this year we started another feature which we call our Advertised Products Index, with the objective of giving the reader a means of reference back to the content of the technical advertisements that are carried in the magazine. The Index has been deliberately designed to be quite brief so that a person looking for a particular subject can quickly scan an entire sub-section of the Index to determine whether the material he is seeking is present in a given issue. We believe the Index fills a gap between the immediate present, when the reader has the opportunity of leafing through a current issue to see what new advertisements and new products are presented, and the catalogues that ultimately contain the extensive compilation of the major products put out by commercial producers. Where catalogues are not available, several years of the magazine will, of course, also constitute an orderly record of the industrial products serving our field. The editors have taken a strong interest in encouraging advertisers to present their material in a fashion that is satisfying to the highly-trained technical reader. Through our selection of items to include in these features, plus some additional correspondence and special projects, we have encouraged the presentation of commercial information in a form that will be most useful to the technical man.

This is a necessarily brief summary of some of the things one technical journal has done in attempting to meet the challenge of an ever-expanding science and literature. Without such efforts this increasing volume will have an inherent tendency to force us toward more specialization. If we are to serve the ever-greater need that industry presents for an integrated record of physical knowledge many more efforts are needed. The key to the answer very clearly lies in the techniques of communication. This challenge is worthy of the highest professional aspirations of the editors and others in this field. If we can succeed in cementing our system of factual knowledge back together through new and improved concepts of technical communication it deserves to be recognized as one of the historically great triumphs of mankind. Just as the development of the scientific method unlocked the secrets of nature, their integration through a revolution in communication will bring us to a great new era in their application. In military parlance we

are in a fluid situation today. The actual devices we adopt in the next two decades to cope with this new problem will have great influence on the ultimate pattern into which future technical communication will crystallize. We are starting the first tentative tests in a historically great experiment. If the experiment is a success we can look forward to an unmeasurably great increase in man's utilization of physical knowledge.

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Honored: Dr. Gustav Egloff, Hon. AIC, of Universal Oil Products Co., Des Plaines, Ill., who received the Washington Award for 1953, at a dinner held February 23rd, in Chicago, Ill. He was cited "for distinguished leadership in petroleum research and development, in professional activities, and in community services."

The award was presented by Ovid W. Eshbach, president of the Western Society of Engineers. Dr. Egloff responded with an address, "The Impact of Petroleum on Our Civilization."

"Petroleum is essential to all phases of modern living," Dr. Egloff said. "Petroleum is not only our primary energy source but also the source of raw materials for about five-thousand different products . . . It is our third largest industry with total investments of $43-billion, and it employs over two-million persons."

In the future, Dr. Egloff forecast, automobile bodies will not dent nor rust; everyone in the world will be well-clothed and housed in attractive quarters, and bath tubs will weigh only about fifteen pounds, but these are only some of the many marvels derived from petroleum that are hiding around the corner. Many of tomorrow's miracles will be made possible through the use of petrochemicals which, in thirty years, have grown into a two-billion dollar industry from a beginning as a by-product outlet. This industry is producing more than 25-per cent of the total chemical requirements of the United States . . . Development of this industry has made possible greater quantities of old products and some entirely new products which add greatly to the convenience of living. The opportunities for the future in this field are limitless, and fantastic as the achievements of the petroleum industry in the past may seem, they are

only an indication of what is yet to come.

Dr. Egloff, former president of THE AMERICAN INSTITUTE OF CHEMISTS, holds more than three-hundred patents in the field of the processing of oil, coal, shale, and the chemical derivatives of hydrocarbons. He is the author of more than six-hundred articles and eleven books relating to this field.

The Washington Award, which has been presented to such personages as Herbert Hoover in 1919; Orville Wright, 1927; Charles Kettering, 1936; Ralph Budd, 1941; Henry Ford, 1944; Arthur Compton, 1945; Vannevar Bush, 1946; Karl Compton, 1947; Wilfred Sykes, 1950; Edwin H. Armstrong, 1951, and Dr. Henry Heald, 1952, is based on recommendation of a commission representing the American Society of Civil Engineers, American Institute of Electrical Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, and Western Society of Engineers.

Acquired: All the outstanding stock of Detergents, Inc., of Columbus, Ohio, by Monsanto Chemical Company. As part of the arrangement, Monsanto also acquires the outstanding stock of Eastern Packaging Company, of Columbus, which packages for Detergents, Inc.

To Be Honored: Kenneth H. Klipstein, F.A.I.C., assistant general manager and head of the Technical Department of Calco Chemical Division of American Cyanamid Co., Bound Brook, N. J., who will receive the 1953 award of the Commercial Chemical Development Association, March 23rd, at the Statler Hotel, New York, N. Y. He is cited for outstanding accomplishment in commercial chemical development.

International Petroleum Exposition: To be held May 14-23 in Tulsa, Oklahoma. Exhibitors number 1500. William B. Way is general manager. Oil men and government officials from fifty nations plan to attend.

New Plant: Started by the Dow Chemical Company at Torrance, Calif., for the manufacture of Styron, a polystyrene plastic. It is scheduled for completion by next fall.

Committee Appointments: By The Manufacturing Chemists' Association include these Fellows of the AIC: Dr. Paul D. V. Manning, International Minerals & Chemical Corporation, and Dr. Ernest W. Reid, Corn Products Refining Company, as members of the Committee on Chemicals in Foods; George Koch, B. F. Goodrich Chemical Company, as a member of the Public Relations Advisory Committee.

Report on Rutgers

Dr. Willem Rudolfs, F.A.I.C.

AIC Delegate to the Inauguration of Dr. Lewis Webster Jones as president of Rutgers University

DR. Lewis Webster Jones was inaugurated as the fifteenth president of Rutgers University, the State University of New Jersey, on May eighth. Rutgers University is the eighth oldest university in the United States and is the only Colonial-chartered school that bears the designation of a land-grant college.

The theme of the conference preceding the actual inauguration was "The Opportunity of the Modern State University." Dr. Harlan Henthorne Hatcher, president of the University of Michigan, stressed the importance of the arts and humanities as a factor in education. Technical development has progressed faster than general education. There are too many particulars in college curriculae. As an example, he cited the catalogue of a liberal arts college, listing some four-thousand courses, which would require a person three-hundred and sixteen years to follow. Even so "man cannot live by bread alone."

Dr. Alvin Christian Eurich, vice president, Ford Fund for the Advancement of Education, spoke about the importance of graduate work in education, and Dr. Arthur Stanton Adams, president of the American Council on Education, spoke about research in the university, emphasizing the need for basic rather than more applied research.

After the Hon. Chief Justice Arthur T. Vanderbilt administered the oath of office, Governor Alfred E. Driscoll, who presided over the inaugural ceremonies, presented the University Charter to Dr. Jones.

In his inaugural address, Dr. Jones pledged himself to expansion of teaching, research and extension, with particular emphasis on opportunities for poor boys and girls and the extension of education for those over sixty years.

Rutgers University dates from 1766 when it was founded as Queen's College, largely through the zeal of Dutch settlers in New York and New Jersey. For a period of about sixty years, particularly following the outbreak of the Revolution, the student body was small. In 1825, the institution experienced a revival and its name was changed to Rutgers College, in honor of Colonel Rutgers, a leading philanthropist of New York city. From this date, the college grew steadily in size and reputation. In 1864 the scope of its activities was broadened as a land grant college.

Subsequently both state and federal agricultural experiment stations became affiliated with the college and

the land-grant units were given the title of State University. Further expansion took place with the establishment of the New Jersey College for Women, absorption of the New Jersey College of Pharmacy, the University of Newark, the School of Business Administration, the South Jersey Law School and the College of South Jersey. The School of Education, University Extension, Graduate Faculty, University College, and the Institute of Microbiology were established. On July 1, 1945, Rutgers University in its entirety became the State University of New Jersey, with at present about sixteen-thousand nine-hundred students, fifty major structures and more than three-thousand acres of land.

Dedication of the Chemistry Building, Rutgers University

Dr. Neil M. Mackenzie, F.A.I.C.
AIC Delegate to the Dedication

RUTGERS' impressive new chemistry laboratory was dedicated on May fifth. It was built and equipped by the people of the state of New Jersey at a total cost of $1,515,000. It can accommodate seven-hundred and seventy-four undergraduates. Four separate laboratories provide working area for sixty-four graduate students. In addition there are seven laboratories for members of the teaching and research staff. The library has space for six-thousand, six-hundred volumes. The equipment includes among other modern scientific tools, a double-beam infrared recording spectrometer and equipment for X-ray diffraction studies.

Dr. Peter A. van der Meulen, director of the School of Chemistry, presided at the afternoon dedication ceremonies. Greetings from the state of New Jersey were conveyed by the Hon. John M. Summerill, Jr., Senator from Salem County. Addresses were made by Dr. Asger F. Langlykke, director of the research and development laboratories of E. R. Squibb and Sons, and Dr. Burnard S. Biggs, of Bell Telephone Laboratories. The building was dedicated by Dr. Lewis Webster Jones, president of the University.

After a guided tour of the building, a dinner for Rutgers alumni and distinguished guests was held in the University Commons. Dr. Hugh Stott Taylor, dean of the Graduate School of Princeton University, presented the feature address, "The Role of the University in Education and Research."

The University, the Rutgers chem-

istry faculty, and the people of New Jersey are to be congratulated for their energy and foresight in building this laboratory in the center of one of the nation's important research and chemical manufacturing areas.

Honored: Dr. Gordon M. Kline, F.A.I.C., physical science administrator, National Bureau of Standards, who was presented with the U. S. Department of Commerce gold medal for exceptional service, February 16th, by the Hon. Sinclair Weeks, secretary of commerce. Dr. Kline was cited "for major contributions to science and technology through pioneering work and accomplishments in the field of organic plastics and for distinguished authorship." Dr. Kline's first federal service was in 1918 as a messenger for the Hon. Herbert Hoover, food administrator during World War I.

Gross Revenue Increase: Of the chemical products industry amounted to 172.63 per cent in the period from 1941 to 1951, according to a survey of corporate revenue and tax payments of 155 companies in 13 major industries, conducted by Fact Finders Associates, Inc., 400 Madison Ave., New York 17, N. Y. The survey also showed that chemical products in 1951 paid out the equivalent of 16.78 per cent of gross revenues in taxes, well above the average of 11.6 per cent of the surveyed industries.

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New Laboratory: To be built by General Chemical Co., Allied Chemical & Dye Corp., at Morristown, N. J., on Columbia Road. Plans include a three-story brick research center of 50,000 square-feet of floor space. An expenditure of about $2,000,000 was indicated. The latest types of physical equipment, including electron microscope and infra-red spectographs, will be installed.

Women: Recognized as "valuable members of the team that enables the Chicago oil industry to perform the big job that it has to do," by Dr. Robert E. Wilson, chairman, Standard Oil Company (Indiana). "Women participate in nearly all phases of our operations. As secretaries, clerks, laboratory technicians, and specialists of many kinds they probably contribute more toward the final results than we are apt to realize. They constitute ten to fifteen per cent of all our personnel — not a small proportion considering the nature of the business".

Moved: The sales, executive and administrative offices of Nuodex Products Co., Inc., manufacturers of chemical additives, to 1 Virginia Street, Newark, N. J. The mailing address of the company continues to be Elizabeth, N. J. Leo Roon, F.A.I.C., president, presiding at the opening ceremonies of the new offices, stated that the main Nuodex plant remains at 830 Magnolia Ave., Elizabeth, along with the Control Laboratory and the offices of Walter Gotham, production vice-president. The Research Laboratories, under the direction of Dr. John R. Skeen, F.A.I.C., are being centralized in the Nuodex Research Building at 1075 Magnolia Ave., Elizabeth.

Appointed: Thomas F. Sears Co., 4085 Valerie, Bellaire, Texas, as representative for Texas and Louisiana, to handle sales and engineering service of centrifugal and positive displacement pumps for Pioneer Pump, Div. of Detroit Harvester Co., Detroit, Michigan.

Industrial Waste Conference: To be held by Purdue University, May 4-6, in the Purdue Memorial Union Building, Lafayette, Ind. Registration is open to anyone interested in waste disposal. For information write Don E. Bloodgood, Civil Engineering Bldg., Purdue University, Lafayette, Ind.

Assistant Supervisor: Of the chemistry and chemical engineering department at Armour Research Foundation, Dr. Harold M. Coleman, F.A.I.C., who was recently named to this position by Clark E. Thorp, F.A.I.C., department chairman. Dr. Coleman was formerly research scientist at Armour and Company, Chicago. He holds several patents and is the author of many technical articles.

Executive Committee: Appointed by Mathieson Chemical Corp., Baltimore 3, Maryland: Thomas S. Nichols, president; John C. Leppart, executive vice president, Stanley de J. Osborne, financial vice president; Carl F. Prutton, vice president responsible for commercial development; and Theodore Weicker, Jr., vice president responsible for overseas activities. John C. Leppart has been appointed president of E. R. Squibb & Sons Division.

Appointed: By the Watson-Standard Company, Charles H. Groff, F.A.I.C., as technical director. He will direct an expanded program of research and development on the company's line of paints, varnishes, lacquers, and plastic compounds. He was formerly technical director of Surface Chemicals, Inc., and he returns to Watson-Standard where he was assistant technical director from 1943 to 1946.

What Are You Going to Do with Your Raise?

W. R. Van Meter

Food Technologist, Hartford, Conn.

(Tip: Buy personal progress and it'll pay double! Reprinted through the courtesy of *Food Engineering*.)

IN THE course of events this year, you—the reader of this article—may be among the considerable number of men in . . . industry who will have the pleasant experience of getting a "raise," or a bonus, or a promotion to a higher paying job.

Let us hasten to say, however, that we are not taking a flyer in the sphere of business prediction. As a matter of fact, with restrictions, controls, costs, and competition what they are, the number of men getting such tangible credit may not be as large, currently, as would otherwise be the case.

Rather, we are referring to promotions, bonuses, and raises as natural factors in the industry generally—and as vital factors in personal progress specifically.

So—to all of you now making such strides, congratulations! There is a very justifiable feeling of pride which accompanies any increase in the pay envelope. It is recognized by all that the additional money is significant—on the part of both the company giving it and the man receiving it.

The writer can ponder back over a number of years of dealing with technical men, and would like to touch on the uses to which this raise should be put.

Any such comment may appear at first blush to be completely unnecessary. Higher living costs, higher taxes and the absolute necessity for having a 24-inch television set in the front parlor would seem to leave little choice about what to do with any raise.

Smart Way?

However, we can recall quite a few men who have actually tried to save the major part—if not indeed the total amount—of any raise given them. "I just pretend I didn't get it," they say, usually with a pretty smug air. "Sock it away in the bank and go on living as usual on the old salary—that's the smart way."

To a fair number of technical men that method looks like the canny way of handling a salary increase, but it is actually the worst possible procedure. That is, if the recipient of the raise is looking for further increases in the years ahead.

It has been very wisely stated that the earning of reasonable sums of money is not a particularly difficult

job. On the contrary, however, to manage with discretion and foresight the earnings that one acquires is indeed a task demanding a great deal of thought.

A Hope Attached to It

Consider for a moment: A man gets more money because management uses that way in which to express its approbation of his present and past work. Also there is this very important point frequently missed by many men: Management, in giving the raise, is expressing the hope that the man will continue to do outstanding work. In other words, that he will continue to grow—in ability to handle his job and in value to his organization.

Now, it should not be forgotten that all too often growth is a taken-for-granted sort of thing. Like sunrise and nightfall and homogenized vitamin D milk delivered on the back doorstep every other morning. But the only growth that follows so inevitable a pattern—after the age of 20—is the familiar process of simply growing older.

That other sort—growth in ability to handle a job more successfully with increased capability—does not come automatically with the mere passage of time. Its development can never be taken for granted. On the contrary, one must work for it, struggle for it, and plan for it shrewdly.

And to nourish this anticipated growth will unquestionably require the spending of some money.

What, specifically, can a man do, then, to justify management's hope for continued growth on his part?

Two Targets

He has two basic areas for development where he can concentrate his efforts. These are (1) his work and the things directly allied to it; and (2) himself, that is to say his own personality.

In cultivating either of these areas it helps to remember that money is essentially a tool which is useful in accomplishing some desired end and is only valuable when so used.

Do you remember the parable of the talents? It recounted how a certain wealthy man, about to travel into a far country, first called his three servants to him and entrusted to each a sum of money. And two of the servants so shrewdly employed the funds given them that by the time the owner returned they had a 100 percent profit to show him. But the third servant was afraid, and went and buried the sum he had received, thus making no use whatever of it. This money benefited neither servant nor master.

Two thousand years have not blunted the point of that parable. Cash remains cash. Whether it is employed in chasing after blondes or any one of a dozen other diversions, money has to be actively used to have any value.

As regards the work area and things directly allied to it, the following ideas are suggested for keeping your growth-development curve rising:

Set aside some portion of the raise for the purpose of acquiring a wider acquaintance in the field of your work. Seek out and cultivate the friendship of men in your industry whom you would perhaps not ordinarily meet. The exchange of viewpoints cannot help but be stimulating and valuable to you.

Most progressive firms have a definite policy designed to encourage the attendance of their personnel at industry conventions and gatherings. However, all do not. And so if your firm is in this latter group, use some of the raise to attend an annual convention, planning part of your vacation if necessary to make this possible.

Also, there may be courses of study which you have wanted to take, but since they are concerned with the fringe of your main work, possibly you have hesitated to spend money to accomplish what may have little practical value. Consider using part of the raise to carry on such study.

A research chemist friend of the writer did exactly this some years ago when he started to take courses in statistics. At the time, the value of such study seemed definitely nebulous insofar as his work was concerned. The expense, also, appeared a bit on the extravagant side. However, being keenly interested in statistics, he took the courses—and today he finds this knowledge a very great help in his work.

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And, it may be mentioned that the company for which he works regards him as a decided asset to the organization because he has shown, and continues to show, the capacity for growth and development which is the life blood of any industrial body.

Packaging, modern instrumentation for process control, or the elementary principles of cost accounting are other examples of fields where you may have wanted to develop more than just a nodding acquaintance with the subject and yet have hesitated because of the expense involved.

It is also commonplace for men in professions such as medicine and dentistry to take "refresher" courses periodically. This is done so that the man practicing the medicine or dentistry can keep himself up-to-date regarding improvements in technique, use of the latest design instruments, changes in current thinking, and the like.

A very large part of the value of

such courses for the "student" comes from the stimulus experienced in working directly with pioneering experts.

Why not, therefore, think of taking a "refresher" course yourself, alloting part of the raise to it to keep abreast of the latest in your field? M.I.T. offers annually an excellent three-week course designed for just such a purpose in food technology. And there are others.

Approach on Personality

What about that other area upon which a man can concentrate some developmental effort? As regards the man himself, how should he use his money?

He should use it to increase his contacts with people. To expand his interests, subscribe to a few magazines, go to concerts or the theater, or take up a hobby. But he should do it all on a "try-and-see" basis, to find out if the activity interests him to the extent that he gets a feeling of satisfaction from it. If it doesn't prove to have any appeal, he ought to try something else.

Remember, that's what money is for—a tool to make it possible for you to find out a great many things about yourself. You are going to be alive on this earth only once, so why not find out as soon as you can all the things that really make you happy to be alive?

One friend of the writer recently learned, at the age of 40, that he gets a lot of fun out of salt water fishing. He could have found it out years earlier and thus have enjoyed the experience all this time.

Use some of the money to have a richer home life. Get your wife out of the kitchen a bit more and make it possible for her to do some of the things she has wanted to do for a long time.

Entertain more. Cultivate the friendship of men in your organization and thus get to know them outside the familiar surroundings of the plant.

Free yourself from some of the routine home chores which almost all of us take for granted. These tasks cost us much in the way of energy used. Moreover, they often prevent us from thinking. To be so busy or so tired from being busy that we no longer have the time or the inclination to think is a very common experience. Yet it is our thinking moments which are the productive ones. We should use some of this money to allot ourselves more of these moments.

Let Mac Do the Mowing

Pay someone else to mow the lawn, to rake the leaves, to shovel the snow, to paint the house, or shingle the garage—and use the time to think. If it's exercise you want, take it in a non-tiring walk and let your brain think along the way.

Thinking is possibly the most difficult work of all—which is one reason

why we avoid it so strenuously. But by the same token it is the highest paid.

What to think about? About the job and ways of improving it, about yourself and your plans and what can be done to see that both flourish and grow. Because you will not be happy unless you are growing.

The above suggestions are not all-inclusive. You can undoubtedly add others which may more aptly fit your own situation. Nor, of course, is it remotely imagined that any raise is going to be large enough to include all the suggestions offered. The gist of the argument is simply that what you have been given should be used as a tool, and not as something to be "hid in the earth".

For if you are one of those men who have had a raise recently—or if you are one of that larger group working toward a raise—then you must give some thought to the use of money.

Putting money to work to increase and strengthen your knowledge of your job, your business, and your industry, as well as to broaden your own personality, is one of the best investments you can make. It will inevitably have favorable repercussions among those higher on the ladder, among those who make up management.

Simply as a matter of sound career planning, money should be so used, for it will result in the raise just earned not being the last one ever gained. The man who uses a goodly portion of each raise in ways that insure his continuing growth in ability and business stature can logically expect more raises to follow in due course.

Remember, it is no less true that individuals, just as businesses, must spend money to make money.

Elected: Dr. Sidney D. Kirkpatrick, Hon. AIC, vice-president of McGraw-Hill Book Co., as chairman of The Atomic Energy Commission's Advisory Committee on Industrial Information. He has served as chairman of this group since it was established in 1949, having been appointed originally by the AEC general manager.

Appointed: By Dr. Henry B. Hass, F.A.I.C., president of Sugar Research Foundation, Inc., the Herstein Laboratories, Inc., 128 Water St., New York, N.Y., to act as screening laboratory for certain projected studies of the Foundation.

Established: By Richard S. Hunter, a new development, testing and consulting group devoted exclusively to appearance and related optical properties of materials. The new laboratory, called the Hunter Associates Laboratory, is located at 5421 Brier Ridge Road, Falls Church, Virginia.

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National Council Meetings

Meetings of the AIC National Council are scheduled to be held at The Chemists' Club, 52 East 41st St., New York, N. Y., at 6:00 p.m., on the following dates:

March 11, 1953

April 8, 1953

May 11, 1953 (Philadelphia, Pa.)

New Position: C. H. Harry Neufeld, M.A.I.C., at the Eastern Regional Research Laboratory, Chestnut Hill Station, Philadelphia 18, Pa. He was formerly assistant professor at The American University, Washington, D.C.

Moved: The Houston District Sales Office of Carbide and Carbon Chemicals Company to the new Prudential Bldg., 1100 E. Holcombe Blvd., Houston, Texas.

AIC Activities

C. P. Neidig, F.A.I.C.

Ohio Chapter

Chairman, Dr. Otis D. Cole
Chairman-elect, Norbert A. Lange
Secretary-Treasurer, Harold M. Olson
Representative to the National Council, Dr. Malvern J. Hiler

The Ohio Award

The Ohio chapter is pleased to announce that Dr. Games Slayter, F.A.I.C., of the Owens-Illinois Glass Company at Newark, Ohio, will receive the 1953 Ohio Award. It will be presented at the Annual Meeting of the Chapter on May first, at Toledo, Ohio.

Los Angeles Chapter

Chairman, T. F. Bewley
Vice-chairman, Peter Stupin
Corresponding Secretary, Blanche Simons
Treasurer, Don Remer
Representative to National Council, Manuel Tubis

Get-Together Luncheon

The Los Angeles AIC Chapter is happy to announce the sponsorship of a luncheon honoring the eastern members of the INSTITUTE who plan to attend the national convention of the American Chemical Society in Los Angeles during the week of March 16th to 19th. Many mutual members of the AIC and the ACS are expected to attend this conclave. No formal speaker or program is planned. The purpose of this luncheon, to be held at the Hotel Statler, March 17, is a general get-together. Some of the problems confronting the profession may be discussed in seminar form.

New York Chapter

Chairman, Karl M. Herstein
Vice-chairman, Savery F. Coneybear
Secretary-Treasurer, Richard L. Moore
Representative to National Council, Dr. Maurice J. Kelley

Student Award Meeting

The 1953 Student Award Meeting of the New York AIC Chapter will be held March 26th at 6:00 p.m., in the cafeteria of Union Carbide & Carbon Corporation, 30 East 42nd St., New York 17, N. Y., Karl M. Herstein, Chapter chairman and president of Herstein Laboratories, Inc., announced.

The speaker for the evening will be Dr. George L. Royer, F.A.I.C., Calco Chemical Division of American Cyanamid Company, on "The Challenge of Analytical Chemistry.

These awards are a yearly feature of the New York Chapter's program, in which outstanding chemistry students in the New York area are honored. Reservations should be made with Dr. Albert F. Guiteras, Hudson Laboratories, Inc., 117 W. 13th St., New York 11, N. Y.

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Chicago Chapter

Chairman, Dr. B. S. Friedman
Chairman-elect, H. F. Schwarz
Vice-chairman, Mary Alexander
Secretary-Treasurer, W. Jacobson
Representative to National Council, Dr. Gustav Egloff

Growing Old — Or Growing Up?

Of course, you're growing older . . . but are you also growing up? When your immediate supervisor is promoted or transferred, will you be ready to step up?

Remember when you left college full of ambition and hopes? In the years which elapsed have you developed a mature judgment, broad viewpoint, and a thorough understanding of your employer's enterprise and the part you have in its operation?

If so, then you are growing up with the job. You're maturing in your work when you begin to see the whole picture, not only from the point of view of an employee but also from the point of view of management.

How aggressive should you be and how

much responsibility should you assume? Does management tend to give the nod to yes-men and cautious men? What qualities must chemists develop or emphasize in order to improve their status with management?

These are some of the questions which will be discussed at the April 15th meeting of the Chicago AIC Chapter. Visitors are welcome. Speaker: Dr. John T. Rettaliata, president, Illinois Institute of Technology; Discussion Leader: A. W. Chapman, assistant head, Research Department, Celotex Corporation; Subject, "How to Improve Your Status with Management." Place, Chicago Engineers Club, 314 S. Federal St., Chicago, Ill. Time, April 15th, 6:00 p.m.

Restrictive Employment Contracts for Chemists

The Chicago AIC Chapter held a meeting February 24th, at the Chicago Engineers Club, attended by sixty-three persons. After the dinner, Dr. Friedman introduced the discussion leader, Helmuth A. Wegner, patent attorney for G. D. Searle and Company, who in turn introduced Prof. Fred F. Herzog, professor of law, Chicago Kent College of Law.

Restrictive employment covenants are quite numerous, Prof. Herzog stated, they are even on the increase. They are not new at all. The old common law outlawed these covenants. As early as 1410 we have one such case, where the contract was outlawed because it was contrary to the public policy of the state (England). The employer's reason for a restrictive clause at this time was the fact the population had declined due to the outbreak of the Black Plague. Today the reason is the protection of trade secrets. Some people do not take out patents, as this costs money, and one must always be on the lookout for a patent infringement after the patent has been issued; it also expires after seventeen years. A trade secret seems preferable to these persons; but the acquisition by another party is only condemned in a Court if it is an illegal act. Everyone has the right to discover the same secret by independent honest work. Thus it is understandable that management wishes to protect itself. But the chemist is thus tied down and we have a clash of economic interests. The law tries to compromise, but it is not always successful. We have employee-minded lawyers and company-minded lawyers.

Restrictive covenants are legal, as long as they are reasonable. What is "reasonable"? We must distinguish reasonability with respect to time, space, purpose of the employer, interest of the public. There are precedents in the Massachusetts and Texas Supreme Courts, where a contract of this kind was declared illegal, because it caused more hardship to the employee than it did good to the employer.

Some specific cases may serve to show the legal entanglement we are in. In 1900 occurred the famous Illinois case: A paper container manufacturer sold his business, stayed on as manager under a restrictive contract, and later opened his own factory a few blocks away from his former place. The Illinois Supreme Court ruled his contract invalid, because it forbade him to open a paper container business in Illinois, Indiana, and Missouri. The Court argued: Not reasonable with respect to space.

The Illinois Appellate Court, 1950, rendered a decision of just the opposite kind: A paint producer, who had sales outlets all over Illinois, trained a young man in the trade, who became more and more efficient and finally ended up as sales manager with a restrictive contract in one of the Illinois stores, but received only $45.00 a week — about what he ever could expect. His restriction said — not within twenty-five miles of any store of the present employer. His next employment, also in paint, was closer than twenty-five miles to one of the stores of the old company, and the Court upheld the validity of the contract, saying that the young man had taken with him a substantial number of the old customers.

Thus several courts, with the same facts, arrive at different conclusions! The Kansas Supreme Court ruled the same setup in a third manner: An old physician in Hutchinson hired a young physician with a restrictive contract, saying — one-hundred miles around Hutchinson. The young man later on opened a practice in Hutchinson. The Court said: one-hundred miles is unreasonable, but five miles is

reasonable. Thus in this case the court rewrote the contract!

Quite a different set-up is encountered in a case in Ohio (1952). Here a dancing instructor, who was under a restrictive contract, changed jobs. Here the Court ruled the contract invalid, because there was no trade secret involved. A thing is not a trade secret just because someone imagines it is. The art of dancing and the teaching of it are never trade secrets.

Chemists are really not interested in the cases quoted. What they want to know is: What can a chemist use for his defense, if he is in court? Here are some pointers: (1) Did the employee violate a trade secret? This must be proved by the plaintiff. Here is where some lawyers lose the case for the defendant. They try to prove that the defendant did not do such a thing. The lawyer for the defendant shall keep his mouth shut and let the lawyer for the plaintiff talk! (2) Considerations: This is a legal term; it means a contract is valid only if both parties give up something. (3) Economic Duress: As a rule, employee must sign the contract, otherwise he loses his job. In Illinois the "yellow dog" contract is outlawed; even if signed with or without economic duress it is still not valid. But the restrictive covenant contract is not outlawed, and never will be; therefore keep the economic duress in mind. (4) Monopoly: The 1410 decision mentioned above was made to prevent the establishment of a monopoly; a monopoly is against the public interest. (5) Irreparable Injury to Employer: If employee's hardship is greater than the benefit to the employer, the court will refuse the injunction.

The best thing is never to go to court. So how can the employed chemist protect himself from the beginning? (a) Don't sign such a contract. This is opposed to what was said in the paragraph on "Economic Duress," but there is sometimes a way to wiggle out of it. (b) Restrict the scope of the covenant; get legal advice. (c) Professional organizations should furnish legal counsel, because the chemist in court will have to fight corporation lawyers, who are employees, and thus must produce; they are the lawyers who are most difficult to fight.

After a short discussion period, Mr. Lippman, arbitration specialist, spoke briefly on arbitration. The professional man protects himself. A litigation today costs ten to fifteen-thousand dollars; even if the right is on his side, the law procedure can wear him out. Thus arbitration is a much better thing; it goes fast, costs but little. The arbiter tries his best to do a fair job, because if he does not, nobody ever hands him a case again.

—WERNER JACOBSON, M.A.I.C.

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Will You Come?

March 11, 1953. Washington Chapter. Luncheon, Bonat's Restaurant. Speaker: Dr. John R. Heller, director, National Cancer Institute, Bethesda, Md.

March 17, 1953. Los Angeles Chapter. Luncheon Hotel Statler, 12:15 p.m. For AIC members attending American Chemical Society meeting in Los Angeles, California.

March 26, 1953. New York Chapter. Student Awards. Cafeteria of the Carbide Building, 30 E. 42nd St., New York, N. Y. Speaker: Dr. George L. Royer of Calco Chemical Division, American Cyanamid Co., "The Challenge of Analytical Chemistry." Reservations: Dr. Albert F. Guiteras, Hudson Labs, Inc., 117 W. 13th St., New York 11, N. Y.

March 31, 1953. Los Angeles Chapter. Speaker: Dr. Harry L. Fisher, Hon. AIC: "Synthetic Rubber." For Information: T. F. Bewley, 1622 So. Westmoreland Ave., Los Angeles 6, Calif.

April 7, 1953. Washington Chapter. Achievement Award Dinner. Roger Smith Hotel, Washington, D.C. 6:00 p.m. Award to Dr. Arno C. Fieldner. Speakers: Dr. William Yant, director of research, Mines Safety Appliance Company of Pittsburgh, "Fieldner, the Man;" and Dr. Alden Emery, secretary, American Chemical Society, "Fieldner and his Professional Activities." Reservations: Arthur Schroder, Chemical Div., National Production Authority, Washington 25, D.C.

April 15, 1953. Chicago Chapter. Dinner 6:00 p.m. Chicago Engineers Club, 314 S. Federal St., Chicago, Ill. Speaker: Dr. John T. Rettaliata, president, Illinois Inst. of Tech., "How to Improve Your Status with Management." Discussion Leader: A. W. Chapman, Celotex Corp. Reservations: John Kre, Armour Research Foundation, Illinois Institute of Technology, Chicago 16, Ill.

May 1, 1953. Ohio Chapter. Annual Meeting, Toledo, Ohio. Morning: Plant trip to Owens-Illinois Glass Co. Afternoon: Business meeting, Dura Glass Center of Owens-Illinois Glass Co. Evening: Ohio Award Dinner, Hillcrest Hotel. The award will be presented to Dr. Games Slayter, F.A.I.C. For information: Harold M. Olson, Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.

May 7, 1953. Pennsylvania Chapter. Dr. Sidney D. Kirkpatrick, editorial director, *Chemical Engineering*, will speak on "The Rocky Road of the Chemical Professor." At this meeting Student Medals will be awarded. For information and reservations: Dr. V. V. Bellino, Barrett Div., Allied Chemical & Dye Corp., Philadelphia 37, Pa. (JE-3-3000).

May 12-13, 1953. Annual Meeting of The American Institute of Chemists. Benjamin Franklin Hotel, Philadelphia, Pa. Presentation of A.I.C. Gold Medal to Dr. J. C. Warner, president of Carnegie Institute of Technology. (See page 162)

May—, 1953. New York Chapter. Presentation of Honor Scroll. Date, place, and program to be announced.

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For Your Library

An Introduction to Scientific Research

By E. Bright Wilson. McGraw-Hill Book Company. xiv + 375 pp. $6.00.

This is a valuable book. It illumines several important aspects of research methods in a useful way and supplies essential guidance that will prove most helpful to workers in research. Its strength lies in the methods it gives for treating experiments, observations and data to draw the greatest possible value from them. Its weakness is that the book was written to be part of a course that would be supplemented and amplified by lectures and by professorial guidance of the student. This point of view leaves a good deal of clarifying and unifying to be done outside the pages of the book so that at some points the text loses some of its appositeness when these aids are missing. Necessarily the approach to research and to its peculiar problems is academic rather than industrial, and the author does not permit himself to use the short cuts that industrial research men employ to save much time and effort.

More than half the book is devoted to the mathematical handling of details of the research. These valuable chapters are: 7. Classification, Sampling and Measurement; 8. The Analysis of Experimental Data; Errors of Measurement; 10. Probability, Randomness and Logic; 11. Mathematical Work; 12. Numerical Computations. The initial chapters deal with choosing and stating the problem, searching the literature, scientific method, design of experiments and apparatus, and the execution of experiments. A final chapter outlines the matter of reporting results.

Every worker in research can profit by Dr. Wilson's discussion but it will prove difficult reading for beginners who will need sound preparation before they can realize its full value.

—D. H. KILLEFFER, F.A.I.C.

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Industrial Oil and Fat Products

Second Edition. By Alton E. Bailey. Interscience Publishers, Inc. $15.00.

This is the principal monograph of a series on fats and oils offered by Interscience Publishers.

Dr. Bailey's background for the first edition was the Southern Regional Research Laboratory at New Orleans. This government laboratory then (and now) comprised an active team of glyceride technologists.

The second edition has been unusually revised, and augmented about twenty per cent. This distinct improvement over the first edition evidences the benefit of Dr. Bailey's industrial experience after leaving the Southern Regional Research Laboratory. Representing more of Dr. Bailey's personal experience in edible glyceride refining, chapters 3, 8, 16, 17, 18, and 23, appear to be better organized and more reliable than the remainder of the book. However the other seventeen chapters show the benefit of other experts relied upon for corroboration and criticism. Chapter 17 on hydrogenation comprises a fifteen-page subsection on hydrogen manufacture and purification. Chapter 22 on polymerization and isomerization omits mention of the OKO process. Design engineers will not find all of the capacity data they need in this book; Dr. Bailey has been more chemist than engineer.

But the book is more comprehensive than could be expected from one man. It is well-written and organized and edited, thoroughly modern and outstanding, a joy to review.

—MARION H. GWYNN, F.A.I.C.

The Thermodynamics of the Steady State

By K. G. Denbigh, Menthuen's Monograph. Pocket size. John Wiley & Sons, Inc. 103 *pp.* 4¼" x 6¾". $1.75.

The thermodynamics of moving equilibria and coupling phenomena, useful for thermal coupling effects in distillation, diffusion, electrical phenomena, and in general for treatment of concurrent processes of flow.

—Dr. John A. Steffens, F.A.I.C.

Biochemical Preparations

Vol. 2. Eric G. Bull, Editor in Chief. John Wiley & Sons, Inc. 109 *pp.* $3.00.

This volume will be a valuable asset to the library of every biochemist who will find here detailed directions for the preparation of 23 compounds of biological importance.

—Dr. Frederick A. Hessel, F.A.I.C.

Table of the Bessel Functions $Y_0(z)$ and $Y_1(z)$ for Complex Arguments

By the National Bureau of Standards. Columbia University Press, New York 27, N. Y. $7.50.

Tables Relating to Mathieu Functions

By the National Bureau of Standards. Columbia University Press. $8.00.

These two volumes are prepared and printed with the precision and the high quality of work expected from the publishers of such material .

Insect Control by Chemicals

By A. W. A. Brown. John Wiley & Sons, Inc. 820 *pp.* 5¾ x 8½". $12.50.

When, about twenty years ago, a cry went up that we were about to be overwhelmed by insects, it was little thought that such remarkable progress would be made in the battle with insects. This book is up to date and in many respects anticipates the future practical developments.

The use and misuse of insecticides is considered from every angle. The entire range of insect life is taken up in detail. This is an excellent book for the specialist and general scientist.

Dr. John A. Steffens, F.A.I.C.

Chemical Books Abroad

RUDOLPH SEIDEN, F.A.I.C.

Macdonal & Evans, London WC1 (Edward W. Sweetman, New York 4): *The Science, Raw Materials and Hygiene of Baking*, by A. Urie and J. H. Hulse; 1952, 458 pp. (50 ill., 49 tables); 30 s.—The most recent scientific findings as well as the latest technics of baking are presented in this excellent textbook, namely: physical, chemical, and physico-chemical principles; baking processes; raw materials and their composition; hygiene (including food contamination, food poisoning, food preservation and storage); nutrition (with a very informative chapter on nutritional value of baked products).

Umschau Verlag, Farnkfurt a.M.: *Was enthalten unsere Nahrungsmittel?*, by W. Heupke and G. Rost; 1950, 111 pp.; DM 12.50.—A comprehensive volume which describes the composition and biological value of our foodstuffs. In detail are discussed—and supported by many complete tables—the basic nutrients, most minerals, the trace elements, and the vitamins. Some experts may question the authors' conclusion that the human body requires for proper nutrition a mixed diet consisting of all parts of plants and animals—leaves and roots, fruits and seeds, muscle meat and liver, milk and bone marrow, etc.

Verlag Hans Carl, Nuernberg: *Mikrobiologie im Reagenzglas*, by Hans Vogel; 1952, 164 pp. (22 ill.); paper covers, DM 5.40.—The layman is taught the fundamentals of microbiology and its applications by means of 92 experiments which he can easily make with very simple, inexpensive equipment; this small volume should be made available in English translation to our teen-agers—many of them, no doubt, would find it as entertaining as the comic books. . . .

George Allen & Unwin Ltd., London WC 1 (D. Van Nostrand Co., N. Y.): *German-English Chemical Terminology*, by A. King and H. Fromherz, 2nd ed., 361 pp. An introduction to chemistry — elementary, inorganic, organic, physical, etc. — bringing on the left side of each spread the English text and on the right

side the corresponding German text. The authors succeed in giving exact definitions of almost 5000 chemical terms by presenting each of them in a suitable context, thus making its meaning clearer than when looked up in a dictionary.

Something New

"Table Top Film Drier." Information. Oscar Fisher Co., Inc., 1000 North Division St., Peekskill, N. Y.

"Inter-Joint Glassware." Catalog requisition forms obtainable from Scientific Glass Apparatus Co. Inc., Bloomfield N. J.

"Gram-atic Balance" Booklet. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

"New Mask and Shield." Information. General Scientific Equipment Co., 2700 W. Huntingdon St., Philadelphia 32, Pa.

"Thermotron, an Electronic Temperature-taking Instrument." Information. Minneapolis-Honeywell Regulator Co., Wayne and Windrim Avenues, Philadelphia 44, Pa.

"Catalog 29." Fischer and Porter Co., Hatboro, Pa.

"Fundamentals of Fuel Knock." 30-minute Sound film. Information. Ethyl Corp., 100 Park Ave., New York 17, N. Y.

"Controlled Volume Pumps and Chemical Feed Systems." Bulletin. Milton Roy Co., 1300 Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.

"Mildewproofing Agents." Technical Service Report. Witco Chemical Co., 295 Madison Ave., New York 17, N. Y.

"Santicizer 3, a Sulfonamide Type Plasticizer." Bulletin. Monsanto Chemical Company, St. Louis 4, Missouri.

"Labline Sectional Furniture." Folder and Price List. The Emil Greiner Company, 20-26 N. Moore St., New York 13, N. Y.

"Improved Indicator to Measure Air [illegible] in New Type Concrete." Information. Central Scientific Company, 1700 Irving Park Road, Chicago 13, Ill.

"Vibrex, Model MS." Information. Hewitt-Robins Inc., 666 Glenbrook Rd., Stamford, Conn.

"Witco Stabilizer No. 90." Technical Service Report S-7. Witco Chemical Co., 260 Madison Ave., New York 16, N. Y.

"New Type Storage Battery." Information. Hester Battery Manufacturing Co., Nashville, Tenn.

"Styron 475 Sheet." Information. The Dow Chemical Co., Midland, Mich.

"Yorkmesh Demisters," catalog. Otto H. York Co., Inc., East Orange, N. J.

"Poly Grip Polyethylene Adhesive." Information. Adhesive Products Corp., 1660 Boone Ave., New York 60, N. Y.

"New Turbine Oil Reclaimer and Conditioning System." Bulletin R-275. The Hilliard Corp., 27 W. Fourth St., Elmira, N. Y.

"Ipco Fog-Free." Information. Industrial Products Co., 2687 N. Fourth St., Philadelphia 33, Pa.

"Armored Flowrator Flow Meter." Catalog. Fischer and Porter Company, 6390 County Line Road, Hatboro, Pa.

"Winner Makes All." Low Pressure Laminates. Booklet. Winner Manufacturing Co., Inc., Trenton 3, N. J.

"MSA Infra-Red Gas and Liquid Analyzer." Bulletin No. 0750-1. Mine Safety Appliances Co., Braddock, Thomas and Meade Streets, Pittsburgh 8, Pa.

"Chemical-Resistant Barrier Rope of Polyethylene" Information. Plymouth Cordage Co., Plymouth, Mass.

"Beaker Bouncer Resilient Mat." Information. Meinecke and Co., Inc., 225 Varick St., New York 14, N. Y.

"New Chemical Feed Packaged Unit." Bulletin 52. Bird-Archer Co., 4337 N. American St., Philadelphia 40, Pa.

"Plastex Corrosion Proof Pipe." Brochure. The Plastex Pipe and Extrusion Co., Columbus, Ohio.

"Spark Arrester-Muffler for Internal Combustion Engines." Information. Kittell Muffler and Engineering Co., 915 South Santa Fe Ave., Los Angeles 21, Calif.

"Dresinate." Technical booklet. Hercules Powder Company, Wilmington, Delaware.

"Denver Automatic Sampler." Information. Denver Equipment Company, 1400 Seventeenth St., Denver 2, Colo.

"The Use of Blended, Synthetic Resin-Rosin Sizing in the Paper Industry." Booklet. Monsanto Chemical Co., Merrimac Div., Boston 49, Mass.

"Modification of Wool by Peroxygen Compounds." Bulletin. Buffalo Electro-Chemical Co., Inc., Buffalo, N. Y.

"Publications of the National Bureau of Standards." List. National Bureau of Standards, U. S. Dept. of Commerce, Washington 25, D. C.

"Metal-Coordination Atom Models." Information. Fisher Scientific Co., 717 Forbes St., Pittsburgh 19, Pa.

"Barrington Jet Mixers." Catalog. Barrington Engineering Corp., 110 West 40th St., New York 18, N. Y.

"Stokes-Windsor Extruders." Brochures. F. J. Stokes Machine Co., 5500 Tabor Road, Philadelphia 20, Pa.

"Filamatic, an Automatic Pipette and Vial Filling Machine." Information. Scientific Glass Apparatus Co., Inc., Bloomfield, N. J.

"New Annin Control Valves, Models 1570 and 1580." Catalog 1500B. Annin Co., 3500 Union Pacific Ave., Los Angeles 23, Calif.

"Fix-so, a New Adhesive Fabric Mender." Information. Cossman Co., 6612 Sunset Blvd., Hollywood 28, Calif.

"Directory of Manufacturers 1952-1953." Steel Shipping Container Institute, Inc., 600 Fifth Avenue, New York 20, N. Y.

"The Application of Precipitated Calcium Carbonates in Reinforced Plastics." Bulletin No. 7. Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 14, Ohio.

"Your Opportunities In Science." Booklet National Association of Manufacturers, 14 West 49th St., New York 20, N. Y.

"New Slurry Mixer." Information. National Foam System, Inc., Union St. and Adams Ave., West Chester, Pa.

"Labelon 'Write On It' Tape." Folder. Labelon Tape Co., Inc., 450 Atlantic Ave., Rochester 9, N. Y.

"Portable, Illuminated Magnifier, Model 66SV." Folder. Stocker and Yale, Inc., Marblehead, Mass.

"New PYRO Surface Pyrometer." Information. The Pyrometer Co. Inc., Bergenfield, N. J.

"New Line of Liquid Detergents." Information. Stepan Chemical Co., 3250 So. Kedzie Ave., Chicago 23, Ill.

"Fire And Explosion Hazards of Thermal Insecticidal Fogging." N.B.F.U. Research Report No. 9. The National Board Of Fire Underwriters, 85 John St., New York 38, N. Y.

"Radiation And Monitoring Fundamentals For the Fire Service." Booklet. International Association of Fire Chiefs, 22 East 38th St., New York 16, N. Y.

"Kjeldahl And Associated Apparatus." Booklet. Laboratory Construction Co., 1115 Holmes St., Kansas City 6, Missouri.

"Electric Ovens And Furnaces." Catalog. Cooley Electric Mfg. Corp., 38 South Shelby St., Indianapolis 7, Indiana.

"Tenlo-70, Oil-Soluble Wetting Agent For Paint." Information. Griffin Chemical Co., 1000 - 16th St., San Francisco 7, Calif.

"Exide-Manchex Batteries in Transparent Plastic Containers." Information. The Electric Storage Battery Co., Box 8109, Philadelphia 1, Pa.

"New Handlamp." Information. General Scientific Equipment Co., 2700 W. Huntington St., Philadelphia 32, Pa.

"Surface-Active Agents Find Widening Uses." Reprint of article. Glyco Products Co., Inc., Brooklyn 2, N. Y.

"The Safe Preservation of Food with Monsanto Benzoic Acid and Sodium Benzoate." Booklet. Monsanto Chemical Co., St. Louis 4, Mo.

"Unloading Sulfuric Acid or Mixed Nitric and Sulfuric Acids from Tank Cars." Manual Sheet TC-1. $0.20. Manufacturing Chemists Association, Inc., 5413 Empire State Building, New York 1, N. Y.

"Brady Quik-Masks." Information. W. H. Brady Co., 16 E. Spring St., Chippewa Falls, Wisc.

"MSA ChemKlos, Work Clothes made of Dynel." Bulletin No. 1309-1. Mine Safety Appliances Co., Braddock, Thomas & Meade Streets, Pittsburgh 8, Pa.

"Locating Common Electrical Faults in X-Ray Generators." Data Sheet. C. J. Woods, Research & Control Instruments Division, North American Philips Co., Inc., 750 South Fulton Ave., Mount Vernon, N. Y.

"Vacuum Filters." Bulletin No. 37. U.S. Stoneware Co., Akron 9, Ohio.

"Optical Pyrometer in Pocket Form." Information. Allied Engineering Division, Ferro Corp., Cleveland, Ohio.

"Insect Exterminator Lamp." Brochure. Solar Electric Corp. Warren, Pa.

"Spectographic Analysis of Diesel Engine Lubricating Oil." Publication. American Locomotive Co., Schenectady 5, N. Y.

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Individualism: Minimized in science, as in economic and politics, in recent years, is important today, said Crawford H. Greenewalt, F.A.I.C., president of E. I. du Pont de Nemours & Company, when he accepted the Chemical Industry Medal Award for 1952 at the meeting of the American Section of the Society of Chemical Industry, October 31st. "We must not lose sight of the fact that no matter how elaborate our facilities, or how highly organized our progress, research progress is still the product of human ingenuity, and depends for its success upon individual achievement. The complexities of modern research require cooperation among men of many disciplines, together with the highest of administrative skills. Yet this teamwork need never submerge the talents of the individual. On the contrary, it should enhance them, since his mind will be left free to pursue the special task for which he has competence . . .

"Another essential to success in research is the provision of an environment in which individual initiative can find its fullest expression. This is as true in the laboratory as it is on

our national scene. Future developments in science and technology will depend on how successfully we can provide the incentives which bring out the best in the individual worker. These may be in the traditional coin of the realm, or in other attractions, depending on what is best suited to produce the desired effect . . .

"I think as a nation we must recognize that whatever the reward of the individual, it is small compared to the national benefits that accrue from this work . . . As a nation we do not dare to be content with a second-best scientific establishment. We can well afford, whatever the cost, to make our science the finest in the world, for the stakes in this effort may be the means of our ultimate survival. Let us therefore insure the habit of personal accomplishment that has made us a great nation. For then, and only then, will we be able to find the full strength that lies in human achievement."

Scope Increased: By the Mexico City office of Foster D. Snell, Inc., which is now offering its contacts, offices, and experience to businessmen who want to avoid frequent trips to Mexico. Inquiries on this service will be answered by the company at 29 W. 15th St., New York 11, N. Y. or by Foster D. Snell de Mexico, Apartado 20.609, Mexico 6, D.F., Mexico.

Chemical Industry: In the State of New Jersey, is the feature article in *Review of New Jersey Business*, for January, 1953, published cooperatively by the N. J. State Department of Conservation and Economic Development, the School of Business Administration of Rutgers University, the State University of N. J., and Rutgers University Press. The article begins: "The State of New Jersey is the leading producer of chemicals in this country — and the production of chemicals is the leading industry in the State of New Jersey."

New Subscribers: To the University of Maine Pulp and Paper Foundation, Orono, Maine, were announced by John B. Calkin, F.A.I.C., secretary. They include Hollingsworth and Whitney, Black-Clawson Co., Rice-Barton Corporation, Sandy Hill Iron and Brass Works, Fraser Paper, Ltd., Oxford Paper Co., and Aston-Hill Mfg. Co. Special gifts were received from Draper Brothers Co., A. Hartung & Co., and The Mead Corp.

Materials Handling Circus: Launched in Miami, Florida, by Yale & Towne Manufacturing Co., of Philadelphia, for a 25,000-mile, two-year trip, across the United States, up into Canada, and down into Mexico — a pioneer move by heavy industrial equipment makers in "take-it-to-the-customer" merchandising.

Twenty-fifth Anniversary: Being celebrated by Glyco Products Co., Inc., of Brooklyn, N. Y. and Williamsport, Pa. Its first products were polyol derivatives used in small volume. Today it makes more than a hundred synthetic organic derivatives. Its new plant at Williamsport, Pa., just opened, covers some 150,000 square feet of building space, and has four railroad sidings. The company now has about one-hundred and fifty employees.

Lead-clad Steel: Its production and fabrication into a wide variety of equipment, the subject of a new color motion picture entitled, "New Weapons Against Corrosion," recently shown to an audience of four-hundred leading metallurgists and scientific specialists, by Knapp Mills, Incorporated, 23-15 Borden Ave., Long Island City 1, N. Y. A brochure listing the history and development of "Ferrolum Lead Clad Steel and Cupralum Lead Clad Copper" includes information on two mediums suited to the handling of radioactive materials.

Chosen: A site near Macomb, Illinois, on the Spoon River, by the United States Atomic Energy Commission, for a new explosives processing and assembly plant. Construction of the new "Spoon River Plant," will start in the Spring. It will cost about $29,000,000.

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Washington, D.C., 412 5th St., N.W.

Non-Technical Help: If supplied to the trained engineer would utilize more effectively his engineering talent, stated Titus G. LeClair, manager of engineering for Commonwealth Edison and Public Service Company of Illinois, at the Fifth College-Industry Conference at Northwestern University. "Requiring an engineer to handle all the details of his job is our greatest source of wasted talent. The obvious answer . . . is to relieve the engineer of his paper work and other non-technical activities by giving him the help of a technical assistant, draftsman, clerk, or perhaps all three."

Purchased: By Gulf Alkali Corporation, the property formerly occupied by the Chipman Chemical Co., 401 Yale St., Houston, Texas. Gulf Alkali Corp., has also taken over the Red Circle Products Co., makers of packaged chemical products, in Houston.

Prices: In the chemical industry, declined almost every month of the past year, the Manufacturing Chemists' Association announces. The wholesale price index of chemicals and allied products, compiled by the U.S. Bureau of Labor Statistics, is only 3 per cent higher than before the Korean War. The index for all commodities, as distinguished from chemicals, is almost 11 per cent higher than pre-Korean War.

Safety Records: Achieved by Calco Chemical Division of American Cyanamid Company and the Nitro, West Virginia, plant of Monsanto Chemical Company. The Calco Division's record was 6,985,294 man-hours without a lost-time accident; the Nitro plant recorded 5,000,000 man-hours of operation without a lost-time accident.

Annual Meeting: Of all sections of the Scientific Apparatus Makers Association, 20 No. Wacker Drive, Chicago, Ill., will be held May 24th to 28th at the Greenbrier, White Sulphur Springs, West Virginia.

Purchased: By the American Alcolac Corp. of Baltimore, the buildings and land at 3440 Fairfield Road, Baltimore, which it formerly leased from U. S. Industrial Chemicals Co. Division of National Distiller Products Corp.

Scholarships: If made available to freshmen students would help to relieve the future engineer shortage, Prof. Kurt F. Wendt, University of Wisconsin, suggests. "Scholarships are being made available principally to junior and senior students, but the opportunities for entering freshmen are quite limited." He added that industry can help students to earn their way by increasing the number of openings for part-time and summer employment.

Elected: By the New York AIC Chapter, Sam Cohen, F.A.I.C., technical service representative of the Glyco Products Co., Inc., as a councilor.

Started: Construction on a half-million dollar addition to the research laboratory of Jefferson Chemical Company, Inc., Austin, Texas, to expand the investigation of petroleum-based chemicals.

Opened: The new plant of General Controls, at 8080 McCormick Blvd., in Skokie, Illinois, to serve midwestern and eastern customers.

Completed: By Monsanto Chemical Company, the dioctyl phthalate plant at Everett, Mass. It was constructed jointly by the Merrimac and Organic Chemicals Divisions of Monsanto.

Announced: By Dr. Edward R. Weidlein, Hon. AIC, president of Mellon Institute, the appointment of Dr. Raymond H. Hartigan as assistant director of research on the Institute's Executive Staff.

Opened: By the Textile Fibers Department of Carbide & Carbon Chemicals Company, a Southern district sales office at 1407 Liberty Life Building, Charlotte, N.C., headed by John H. McCormick.

Appointed: Jonathan D. Lankford as chief of the Region V Fuels Technology Division, Bureau of Mines, Department of the Interior, at 2908 Colfax Avenue South, Minneapolis, Minnesota, to succeed Alex. C. Burr, resigned.

Practice Resumed: By Nelson Littell, F.A.I.C., as a patent attorney and solicitor of patents and trademarks, under the firm name of Hammond & Littell, 350 Madison Ave., New York 17, N. Y.

Industrial Trend: During 1952, the increased use by industry of more instrumentation and automatic control equipment, according to Henry F. Dever, president of the Brown Instruments Div., Minneapolis-Honeywell Regulator Co. The increase in industrial instrumentation showed a 10 per cent rise over 1951. The trend is expected to continue.

Graduate Fellowships: In chemistry and foods and nutrition available for 1953-54, from the Carver Foundation, Tuskegee Institute, Alabama. Fellows devote half-time to supervised research and half-time to graduate study leading to the Master's degree. Stipends cover educational fees and living accommodations. Request information from the Director of the Carver Foundation.

New Position: Accepted by John T. Eiker, 3rd, F.A.I.C., as project engineer with the Engineering department at Congoleum-Nairn, Inc., Kearny, N. J. He was previously with the Engineering Service Division of the du Pont Company.

X-ray Diffraction School: Held semi-annually by North American Philips Co., Inc., at 750 South Fulton Ave., Mount Vernon, N. Y., is scheduled for the week of April 20-24th. Registration is limited to one-hundred persons. There is no fee.

New Research Center: Being constructed by Arthur D. Little, Inc., on Concord Turnpike, Cambridge, Mass. Completion date is planned for January 1954. The company's experimental operations in physics, chemical engineering, new-product development, and production methods, will occupy the two-story, E-shaped structure of almost 60,000 square feet.

Preview of Plans for the Thirtieth

AIC Annual Meeting

May 12th and 13th

Benjamin Franklin Hotel, Philadelphia, Pa.

Monday, May 11th

5:00 p.m. President's Reception to National Council

6:15 p.m. Council Dinner and Meeting
Board of Directors Meeting

Tuesday, May 12th

8:00 to 9:30 a.m. Registration and Coffee Hour
Pre-registration (received before May 5th)
AIC Members $2.00
Non-Members $3.00
Registration at Door, AIC Members $3.00
Non-Members $4.00

10:00 a.m. Annual AIC Business Meeting
Presentation of Annual Reports from Committees and Chapters. Election of Councilors.

12:15 p.m. Informal Luncheon. Speaker from Philadelphia on local history.

2:00 p.m. Concurrent Session A
Panel Discussion covering research policies on the management level on other than technical matters. Panel Leader, Ray Boundy, Vice President for Research, Dow Chemical Co.
Concurrent Session B
Recent Advances in Medicinal Chemistry. Chairman, Earl Arnow, Research and Development at Sharp & Dohme.

6:00 p.m. Social Hour
(No dinner plans are announced so that individuals may make their own arrangements for this evening.)

Wednesday, May 13th

8:00 a.m. Council Breakfast

9:00 a.m. Registration (continued)

9:30 a.m. Concurrent Session C
Evaluation of Technical Personnel. Panel of Personnel Representatives to develop different evaluation plans.
Concurrent Session D
Recent Advances in Industrial Chemistry, including titanium, soil conditioners, silicones, fluorochemicals, fiber glass laminates.

12:15 p.m. Honor Recipient's Luncheon.
Toastmaster: Dr. Emil Ott.
Presentation of Honorary Membership to Dr. J. C. Warner, president of Carnegie Institute of Technology: President Lincoln T. Work.

2:00 p.m. General Session
The Future of Research. Dr. Maurice Nelles, Director of Central Research, Borg-Warner Corp., Bellwood, Ill.
Two Case Histories of Research Developments and Acquisitions showing how effective commercialization has an impact on the profession of chemistry.
The Progress of Individuals in Their Profession. Robert F. Moore (Author of "How Am I Doing"), General Manager, Richardson, Bellows & Henry, 57th St. & Fifth Ave., New York, N. Y., and a colleague.

5:30 p.m. Reception to Medalist

6:45 p.m. Dinner for the award of the AIC Gold Medal to Dr. J. C. Warner.
Toastmaster: Dr. Edward R. Weidlein
Speaker for the Medalist: Dr. Walter J. Murphy
Presentation of the Gold Medal: Dr. Gustav Egloff, chairman of the Jury of Medal Award
Acceptance: Dr. J. C. Warner

Annual Meeting Committees

Honorary Co-Chairmen of the Annual Meeting: Dr. E. R. Weidlein and Dr. Emil Ott

Program: C. P. Neidig, Berwyn, Pa.

Arrangements: Marcus Sittenfield, 1411 Walnut St., Philadelphia 2, Pa.

Special Events: Hillary Robinette, Ardmore, Pa.

Ladies: Mrs. Hillary Robinette will see that the ladies attending this Annual Meeting have an enjoyable time.

Treasurer: John H. Staub, Barrett Div. Allied Chemical & Dye Corp., Margaret & Bermuda Sts., Philadelphia 37, Pa.

Publicity and Registration: Dr. Walter W. Thomas, Hercules Powder Co., Experiment Station, Wilmington 32, Del.

Condensates

Ed. F. Degering, F.A.I.C.

Buckman Labs., Inc.

A new program intended primarily to assist and advance the teaching of chemistry in American colleges and universities will be begun by the duPont Company next fall. Thirty-two institutions will receive new fellowships or grants for the next academic year as the result of a comprehensive survey by the company that revealed the need for such assistance. The expenditure during 1953-1954 for such projects will total about $600,000.

Synthetic fiber-production capacity is expected to zoom to 400-million pounds during 1953.

No well-informed person has declared a change of opinion to be inconstancy.

—CICERO.

Change is inevitable in a progressive country, change is constant. —DISRAELI.

The supreme values are self-respect, integrity of mind, contempt of fear, and hatred of sham.

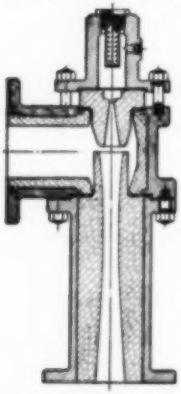
—WILLIAM HOLDING ECHOLS.

Today is not yesterday; we ourselves change; how can our works and thoughts, if they are always to be the fittest, continue always the same? Change, indeed, is painful; yet ever needful.

—CARLYLE.

Do not think that years leave us and find us the same. —LORD LYTTON.

C-R Evactors Meet Corrosion Problems



The chemical industries are employing more and more Croll-Reynolds Evactors in vacuum processes where corrosion resistance is a major consideration. These steam jet vacuum units provide pressures ranging from a few inches to a few microns. Croll-Reynolds is a pioneer in the use of new construction materials and our engineers are investigating corrosion problems continually.

Stainless steels, Monel metal, Beryllium copper, Ni-Resist, PMG metal, hard lead, special bronzes, Hastelloy, and Illium are but a few of the special metals which find their way into our equipment. Carbon is used extensively as a lining material, and many plastics including Teflon and synthetic materials are used for making complete Evactors.

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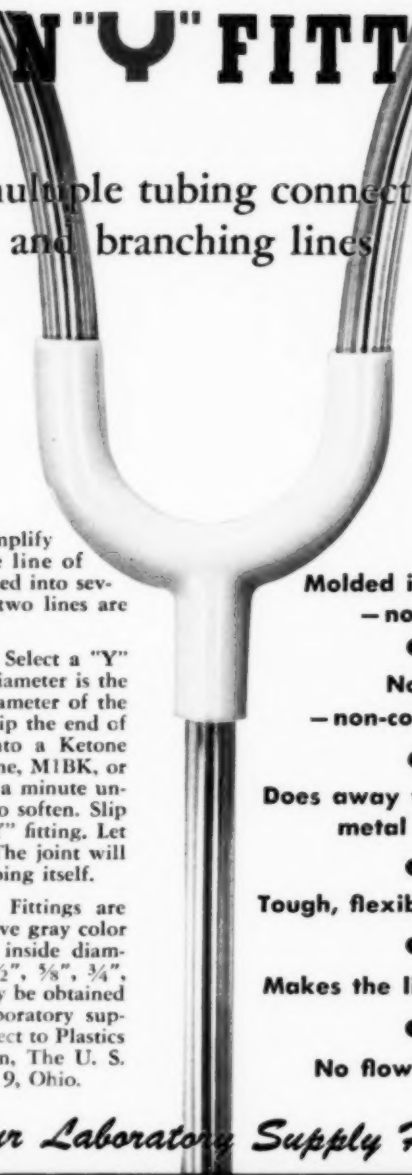

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